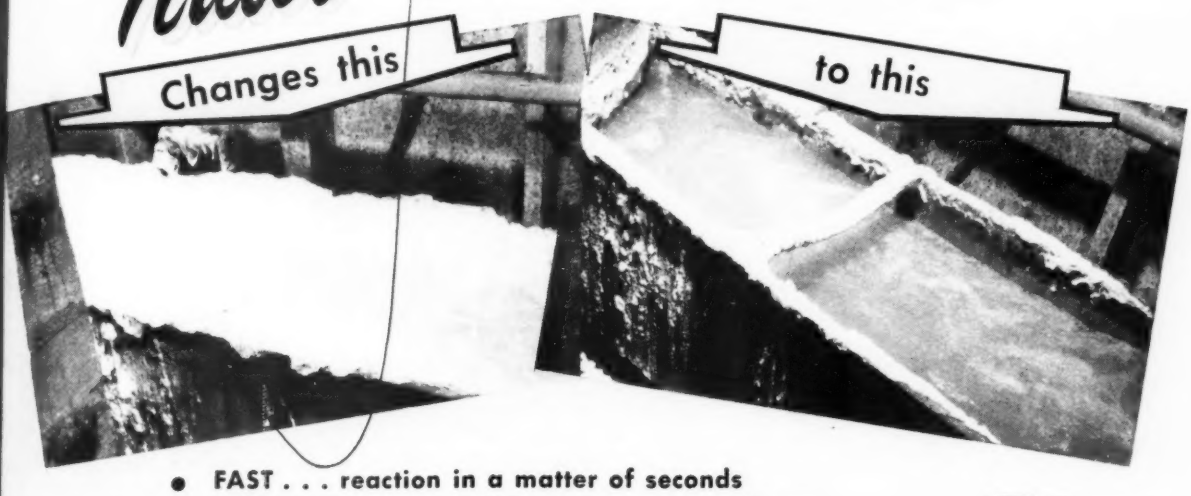
TECHNOLOGY DEPT.

- Safety Congress meets in Chicago
- Beta gauges at the wet end
- Organic coatings for paper
- Colorants in the paper industry

The Paper Industry

Publishers of PAPER AND PULP MILL CATALOGUE

Nalco 71-B LIQUID ANTIFOAM



- FAST . . . reaction in a matter of seconds
- EFFECTIVE . . . as a defoamer—as an antifoam
- FAR MORE ECONOMICAL . . . than paste or briquette

Here is what happened when *liquid* Nalco 71-B was tried in a well-known mill plagued with the foaming problem of high-resin pulp.

At a cost of only *one-sixth as much* as the previous antifoam, the mill reported Nalco 71-B *eliminates all foam in seconds!* Sheet quality remains high, and production stoppages and slow-downs due to foaming have been eliminated. Fibre loss to sewers is extremely low and cleaning of cell room and screens has been substantially reduced. Small wonder the mill continues to use Nalco *liquid* 71-B in both primary and secondary pulp screen processes.

There is a whole series of Nalco antifoams designed to get *results* like this in your mill. Ask your Nalco Representative about them, or write direct to Nalco.

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CANADA: Alchem Limited, Burlington, Ontario
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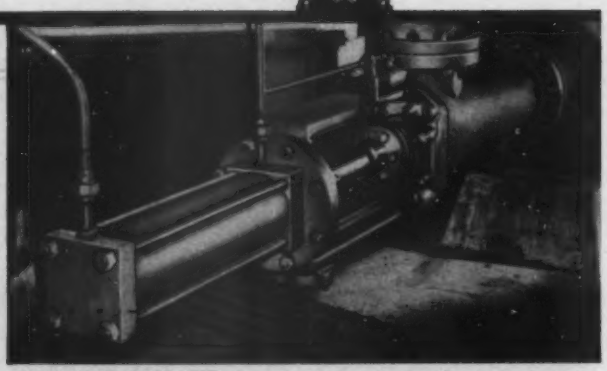
THE Nalco® SYSTEM...Serving the Paper Industry through Practical Applied Science

full, free digester discharge



HYDRAULIC-OPERATED Yarway Digester Blow Valve—one of six installed at large North Carolina paper mill.

MOTOR-OPERATED Yarway Digester Blow Valve—one of eight installed at large Canadian paper mill.

Digesters blow fast and clean with YARWAY Seatless Blow Valves.

The hollow sliding plunger has no pockets where wood chips or tramp materials can hang up.

All Yarway Digester Valves have full pipe area, permitting fast discharge with minimum pressure drop. Comparisons show greater discharge area—reducing blowing time, increasing number of cooks.

Scores of pulp mills report *lower operating costs* and *increased production* due to YARWAY Digester Blow Valves. One large mill found *savings in operation and maintenance the first year more than paid the cost of their 4 new Digester Valves!*

YARWAY Seatless Digester Valves can be furnished either with electric motor or hydraulic cylinder units. Both are remote controlled. Bulletin B-441 gives the whole story. Write for it.

YARNALL-WARING COMPANY

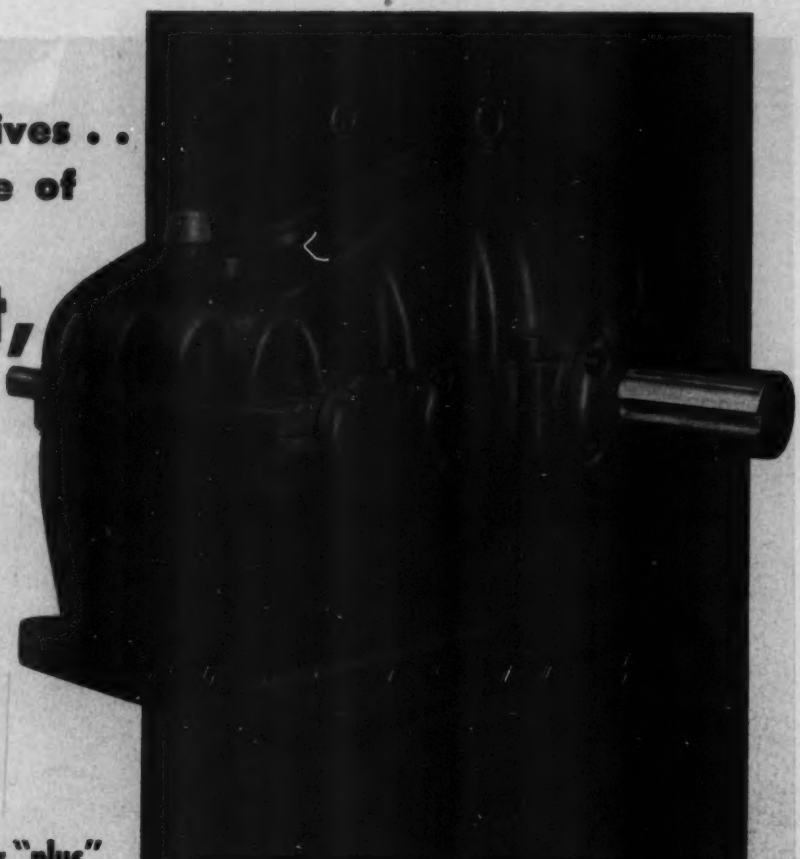
149 Mermaid Avenue, Philadelphia 19, Pa.

BRANCH OFFICES IN PRINCIPAL CITIES

·· DIGESTER BLOW VALVES

In heavy-duty drives . . demand assurance of

permanent, accurate shaft alignment



It's yours... with these other "plus" performance features—in LINK-BELT Parallel Shaft Drives

Under the shocks and overloads that are often imposed upon parallel shaft gear drives, rugged housing construction is compulsory if shaft alignment is to be maintained. That's why Link-Belt adds special reinforcement at points of greatest stress . . . has developed this design expressly for endurance in heavy-duty service.

Write for Book 2619 on this broad line with ratios to more than 300:1. Or get first-hand facts from your nearest Link-Belt office or authorized stock-carrying distributor.

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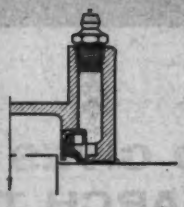

Grease-Lubricated Seals on all input and output shafts prevent entrance of dirt, water.

Precision Gears and Shafts are arranged to provide high reduction ratios in small space.

Automatic Splash Lubrication reliably supplies oil to all gears and bearings.

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Mead's million-dollar research laboratory is the scene of constant pulp research. Here a highly trained research technician studies methods for adding strength to wood pulp with a view to improving paper quality.

MEAD GIVES YOU RESEARCH TO IMPROVE PULPS

Mead Research facilities, among the most modern and complete in the industry, are being extensively employed for the study of various wood species in pulp, paper and board operations. Increasing yield, improving fibre types, and perpetuating wood supply —these are objectives designed to better equip you, the manufacturer, to meet the ever-increasing quality demands in the trade today.

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Where bulk, opacity, printability or absorbency is a part of your quality requirement, *Mead Bleached Soda* has been specifically developed to do these jobs. The world's largest producer of this grade, the Mead Corporation has been for years a reliable supplier to the market from its centrally located and completely modern pulp operation at Kingsport, Tennessee.

Tell us what your pulp requirements are, and we will be glad to have a representative call at your convenience to tell you how we can best serve your needs.

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BLEACHED AND UNBLEACHED CHEMICAL AND MECHANICAL WOOD PULP

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118 WEST FIRST STREET, DAYTON 2

MEAD pulp

The Paper Industry

Technology • Engineering • Management • Production

VOLUME 38 • NUMBER 8 • NOVEMBER 1956

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From our point of view . .

Are we prepared to prevent disaster?

THE VERY DEFINITION of the term "accident" implies that accidents can and always will happen, despite all the measures that can be taken to prevent them. While preventive measures cannot completely abolish accidents, they can however reduce their frequency to a minimum. Fortunately, we recognize the need for achieving a minimum in accident frequency, both from the economic and humanitarian standpoints. We further realize that most accidents are preventable, and this is ample justification and incentive for extending and perfecting the safety programs to a point where an absolute minimum of accident frequency is reached and maintained.

We can safely say, without starting a controversy, that the accident frequency rate of 7.78 reported for 1955, with the resulting 4,541 injuries in the pulp and paper industry, is not the attainable absolute minimum.

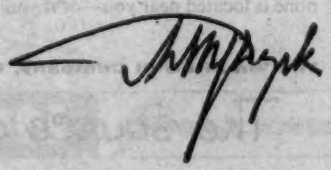
While the industry generally recognizes the need for maximum safety in mill operations, the steps taken to insure this safety are often not as fundamental or decisive as they should be. Top management often fails to identify itself with the safety program, the program itself is not viewed as an integral part of the production effort, and the concept of safety remains vague in view of a widespread misuse and misunderstanding of the safety terminology.

It is in the direction of safety terminology where we need a drastic realignment toward a more exact usage and appreciation of terms.

As so aptly pointed out by Prof. George W. Harper of the University of Illinois in his paper, "Old Wine in New Bottles," presented at the 44th National Safety Congress, we talk about investigating accidents when we mean investigating injuries; we talk about accident prevention when we mean injury prevention; the emphasis everywhere is on injuries which we call accidents—so that a "lost-time injury" is known as a "lost-time accident". Quite inadvertently then, through indifference to an exact terminology and through complacency, we have, in the words of Professor Harper, become "ambulance chasers".

An effective safety program should place emphasis on accidents rather than injuries. It should encompass all accidents and not merely those that cause lost-time or injury. All accidents are a potential cause of lost-time and injury, and it is usually through an accident in itself that a no-injury or no-lost-time accident, allowed to pass into oblivion without investigation, causes no, or only insignificant, injury.

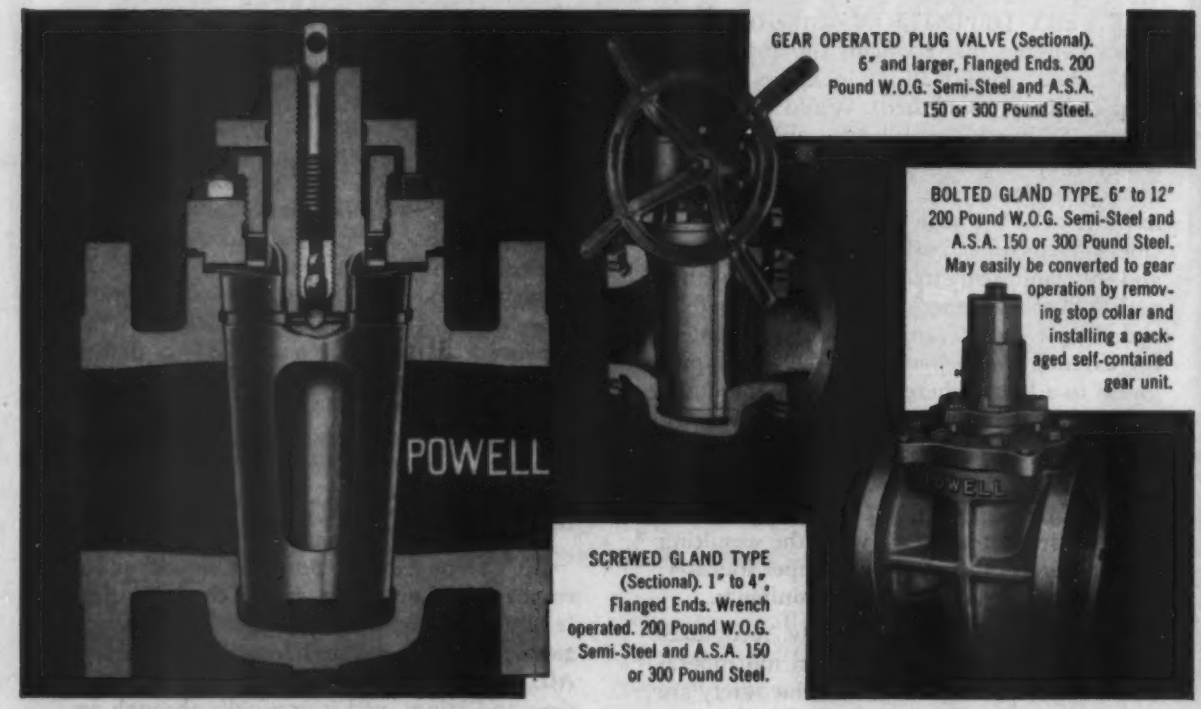
Let us put the emphasis where it belongs—on accident prevention. If we stop the accidents, we will automatically stop the injuries.



POWELL

Lubricated Plug

VALVES



GEAR OPERATED PLUG VALVE (Sectional). 6" and larger, Flanged Ends. 200 Pound W.O.G. Semi-Steel and A.S.A. 150 or 300 Pound Steel.

BOLTED GLAND TYPE. 6" to 12" 200 Pound W.O.G. Semi-Steel and A.S.A. 150 or 300 Pound Steel. May easily be converted to gear operation by removing stop collar and installing a packaged self-contained gear unit.

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Powell Lubricated Plug Valves maintain our 110-year tradition of quality and precision. Only the finest available materials are used. And painstaking quality control is rigidly enforced through each and every step of manufacture.

Features include quick and positive operation—just a quarter-turn to open or close. Lubricant grooves surrounding each port provide a positive seal when the valve is closed. In an open position, seating surfaces are not exposed.

Valve users who want one source of supply for lubricated plug as well as all types of bronze, iron, steel and corrosion-resistant valves will want full details on Powell Lubricated Plug Valves.

Available in Steel and Semi-Steel through distributors in principal cities. If none is located near you—or if you need help on valve problems—write direct to

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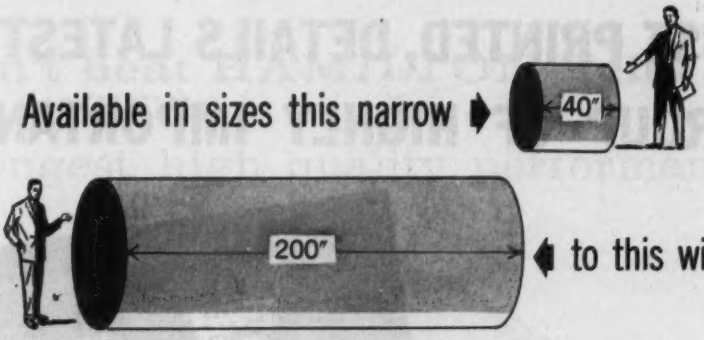
BRONZE, IRON, STEEL AND CORROSION-RESISTANT VALVES

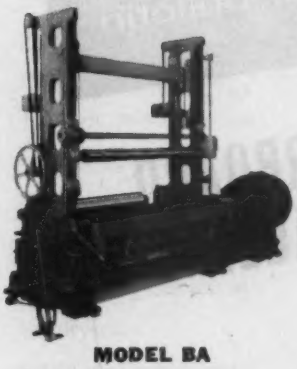
The Wm. Powell Company, Cincinnati 22, Ohio . . . 110th YEAR

The source of supply for all valve needs!

LANGSTON SLITTERS & WINDERS

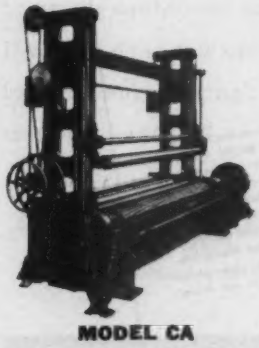
MODEL AA





MODEL BA

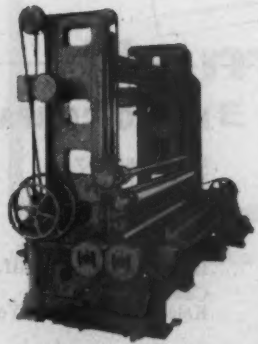
The famous Langston shear-cut slitters cut all weights and grades of paper and paperboard—sharpening themselves as they run. They cut like scissors instead of a knife. Clean-cutting, they keep dust to a minimum. Assure square edges on sheet, clean rolls, and a clean plant. Shear-cut slitters are standard equipment on Langston Slitters & Winders without special order or extra charge. Various types of drive are available, depending upon the desired operating speed and the materials to be handled. Write for specific information on the size machine you need. SAMUEL M. LANGSTON CO., CAMDEN 4, N. J.



MODEL CA

SPECIFICATION TABLE

	MODEL AA	MODEL BA	MODEL CA	MODEL DA	MODEL DH
Widths	40, 50, 60 and 72″	62, 72, 82 and 92″	82 to 122″	82 to 168″	100 to 200″
Speeds to	1500 fpm	2000 fpm	2000 fpm	3000 fpm	3500 fpm
Max roll dia	28, 36 or 42″	40, 50 or 60″	40, 50, 60 or 72″	40, 50, 60 or 72″	72″
Min cut	¼″	1 9/16″ stand 1⅜″ spec	2⅛″ stand 1½″ spec	3″ stand 1½″ spec	3½″ stand
Winding drums dia	8 7/16″	9½″	11″	14″	18″
Idlers dia	3⅜ or 6¼″	6⅜ or 9 7/16″	8½ or 10¼″	8½, 10¼ or 12½″	10¼, 14 or 18″
Cutter shaft dia	3″	4⅜″	5½″	7¼ and 8¼″	8¼″
Pressure roll dia	3 or 4½″	5⅜ or 6⅜″	7½ or 9⅜″	8⅜ or 10⅜″	10⅜″
Weight	9000 lb (50″ mach)	17,000 lb (72″ mach)	23,080 lb (102″ mach)	36,000 lb (122″ st)	60,000 lb (160″)

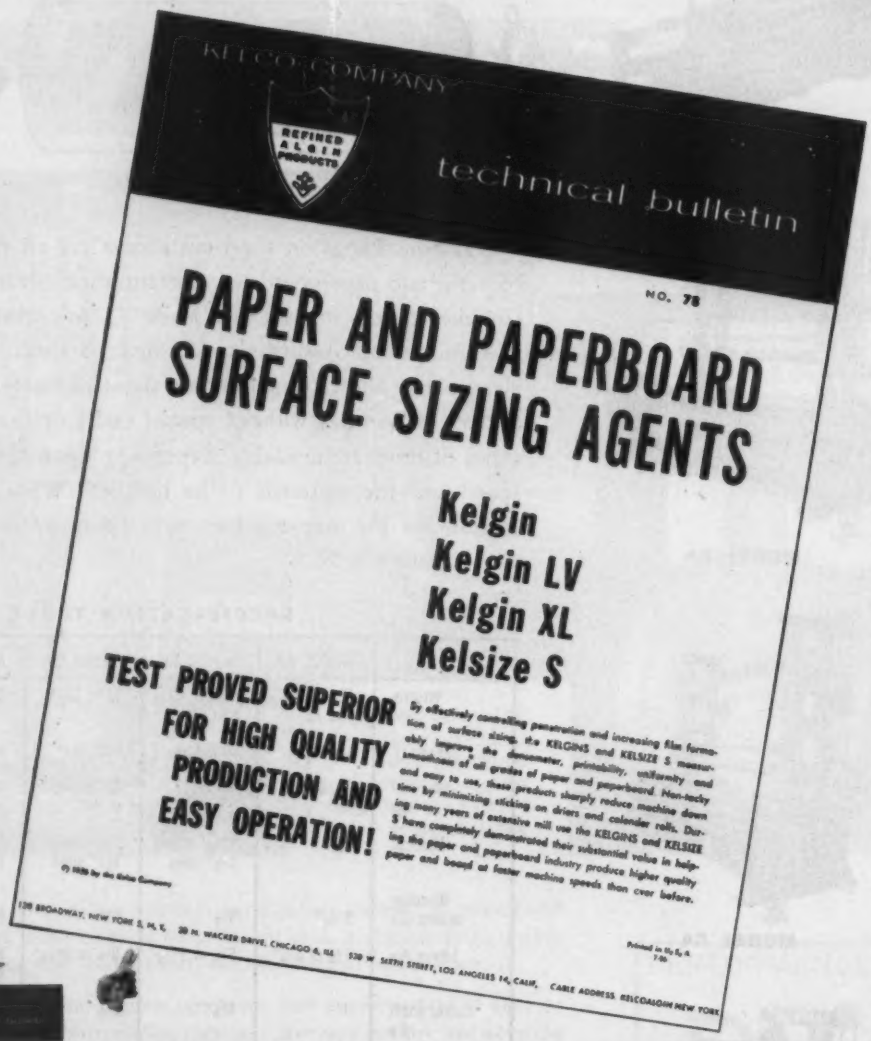


MODEL DA

LANGSTON leadership by design

NEW TECHNICAL BULLETIN

JUST PRINTED, DETAILS LATEST DATA ON BROAD GROUP OF HIGHLY IMPORTANT APPLICATIONS


KELCO COMPANY

REFINED ALGIN PRODUCTS

technical bulletin

NO. 78

PAPER AND PAPERBOARD SURFACE SIZING AGENTS

Kelgin
Kelgin LV
Kelgin XL
Kelsize S

TEST PROVED SUPERIOR FOR HIGH QUALITY PRODUCTION AND EASY OPERATION!

By effectively controlling penetration and increasing film formation of surface sizing, the KELGINS and KELSIZE S measurably improve the densometer, printability, uniformity and smoothness of all grades of paper and paperboard. Non-tacky and easy to use, these products sharply reduce machine down time by minimizing sticking on driers and calender rolls. During many years of extensive mill use the KELGINS and KELSIZE S have completely demonstrated their substantial value in helping the paper and paperboard industry produce higher quality paper and board at faster machine speeds than ever before.

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YOURS WITHOUT OBLIGATION, this Technical Bulletin provides specific solutions to problems of improving densometer, printability, uniformity, smoothness, and for reducing machine down time due to dirty calender rolls and dryers. Fully described are the advantages provided by the use of the unique KELGIN products in size press, tub size and calender stack applications. Complete formulation and usage information is given along with the substantial operating and economic benefits that can be secured.

Write for your free copy of this valuable Technical Bulletin today.

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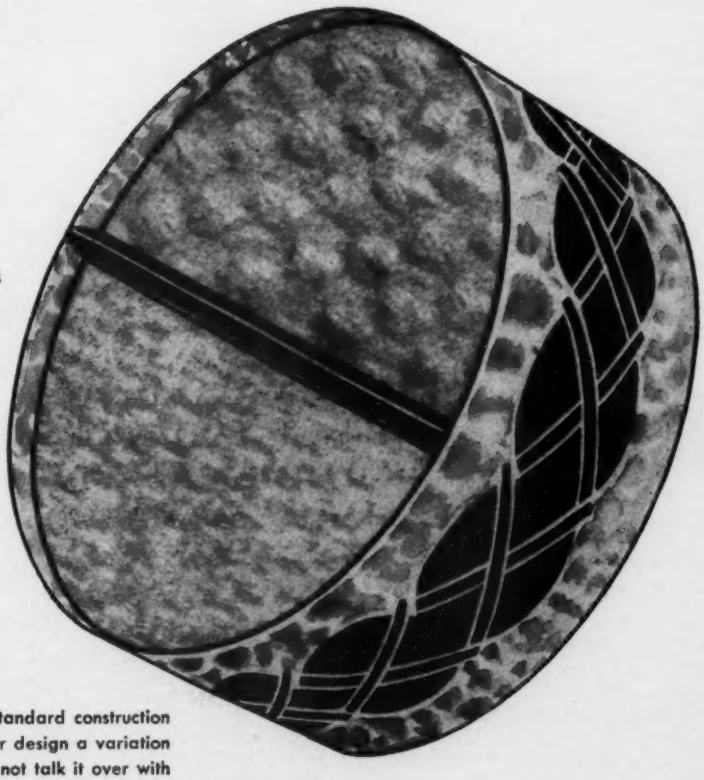

We can supply a Hamilton Felt of standard construction from more than 300 proven styles, or design a variation to solve your specific problem. Why not talk it over with your Hamilton Felt Service Salesman?

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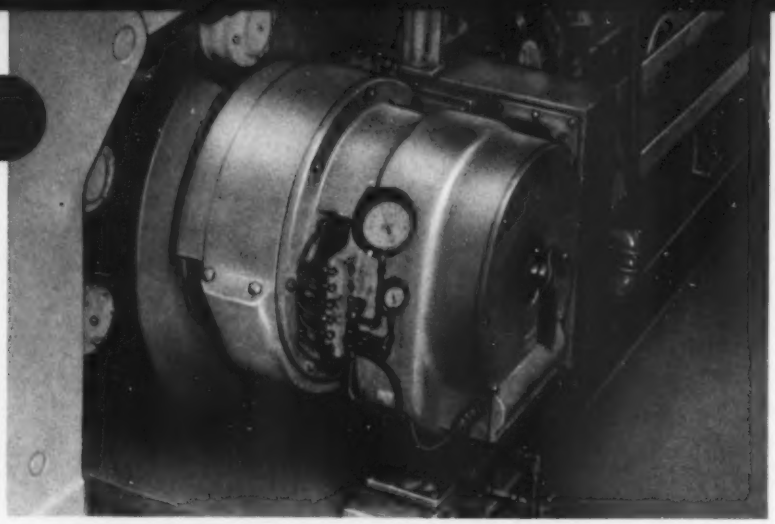
Just write me on your company's letterhead at the address below and I'll be happy to send you a paper-maker's cap just like mine for your son, daughter or grandchild. No obligation. The cap is adjustable— fits any head size, and carries a SAFETY SLOGAN. Supply limited. Write me today.

SHULER & BENNINGHOFEN, HAMILTON, OHIO

suction couch roll



Black-Clawson-Downingtown rolls are furnished in many variations for:

Fourdriniers
- Suction Couch Roll

Cylinder Machines
- Suction Drum Roll
- Suction Cylinder Couch

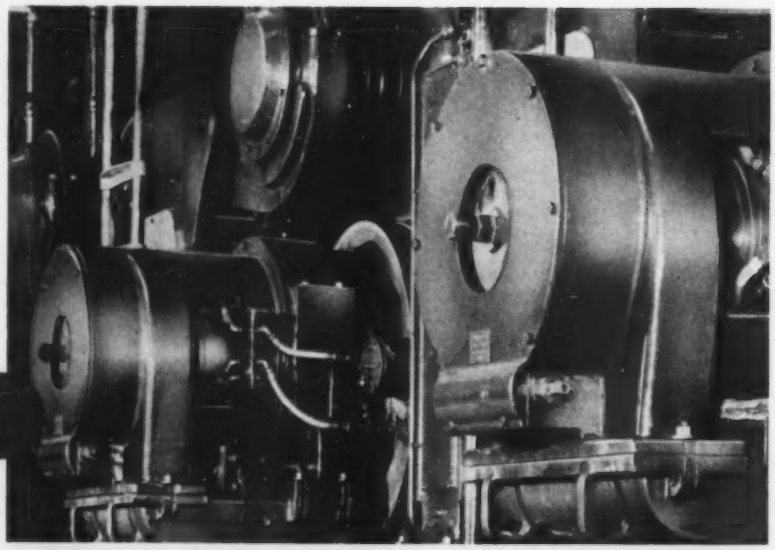
Press Sections
- Suction Pickup
- Suction Transfer Press
- Suction Main Presses
- Suction Primary Presses (Cyl. Mach.)
- Inverse Suction Press
- Suction Hot Press

Felt Conditioning
- Suction Wringer Rolls
- Suction Felt Rolls

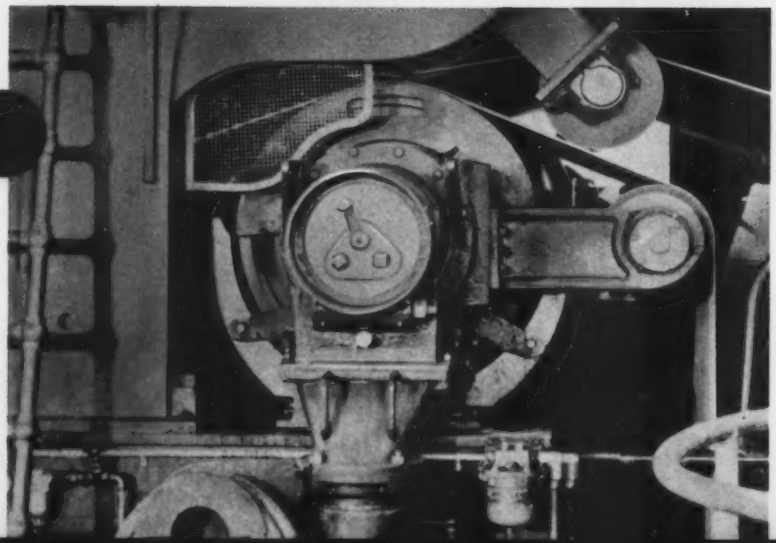
Forming Sections
- Suction Cylinder Couch

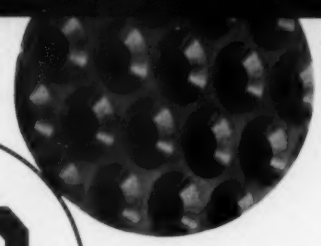
now it's

suction press rolls



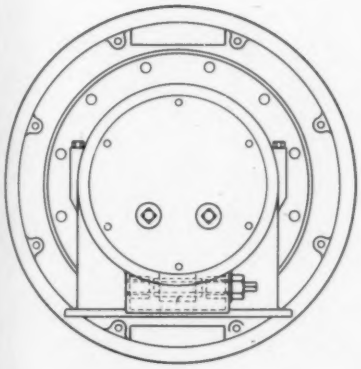
suction hot press





Black-Clawson - DOWNINGTOWN

for all suction roll applications



Black-Clawson is now engineering and manufacturing a complete line of suction rolls based on the widely accepted designs and specifications developed by the former Downingtown organization.

Rolls up to 54″ in diameter and 360″ in length for all applications on Fourdrinier, cylinder and wall board machines can be furnished through the production facilities now located at Black-Clawson's Paper Machine Division, Watertown, N.Y.

All important factors such as diameter, shell material, drill pattern, width of box and vacuum requirements are carefully analyzed by experienced suction roll engineers in the proper application of various types of rolls to meet specific production requirements of existing and new machines.

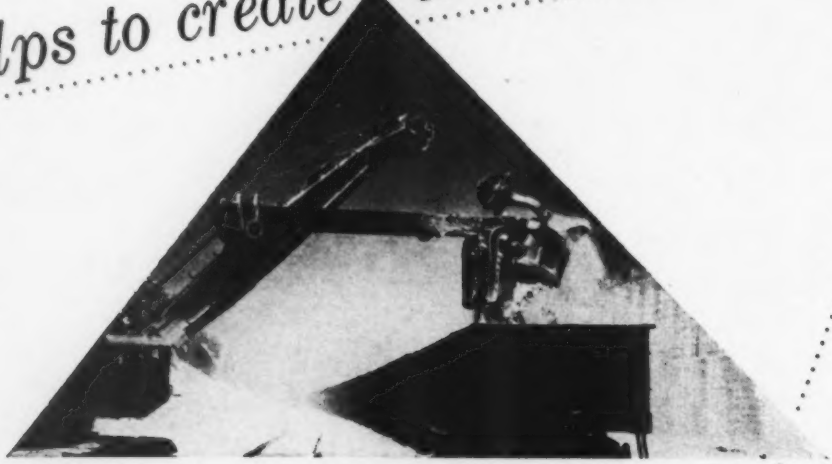
Call on Black-Clawson for advice, engineering and service on all suction roll applications.

The Black-Clawson Company

Paper Machine Division • Watertown, N.Y.

SULPHUR

helps to create headline products



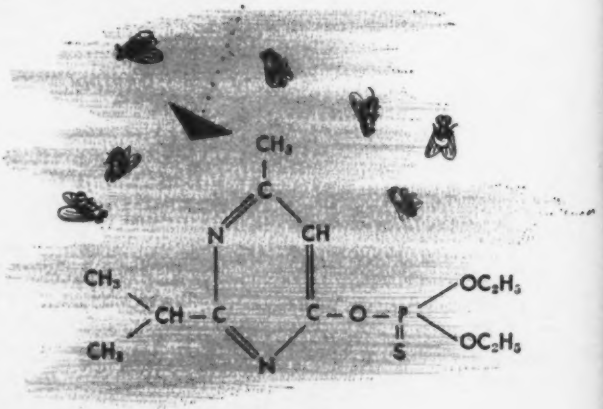
DIAZINON*

What a 'killer' this complex chemical is turning out to be! And quite impartial as to its victims: — houseflies, barnflies, fruitflies, aphids, mites, ants, beetles, chinch bugs, roaches, and many other pests that bother man and beast. It kills them dead!

As with the former chemicals which made such notable headway in man's fight to subdue these destructive pests, Sulphur is very much in the picture—here is one of the many variations of the benzene ring . . . the Diazinon Formula. That letter "S" tied in with the letter "P" discloses the all-important thiophosphate.

Sulphur, often called one of the Four Pillars of the Processing Industry, is benefiting mankind in many ways. None is more important than that of controlling crop-destroying pests.

**A product of the Geigy Chemical Corporation.*



Texas Gulf Sulphur Co.

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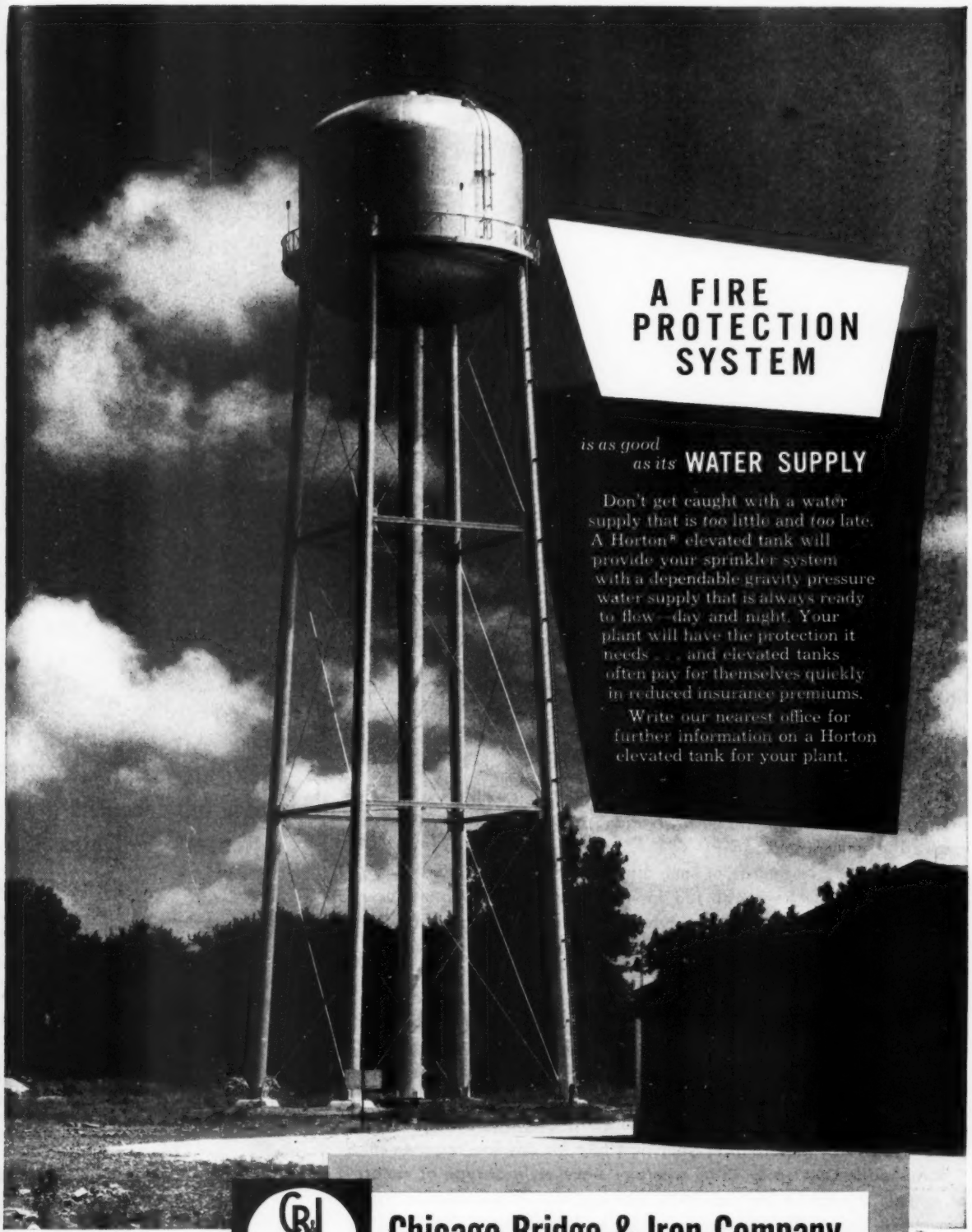
811 Rusk Avenue, Houston 2, Texas

Sulphur Producing Units

- Newgulf, Texas
- Moss Bluff, Texas
- Spindletop, Texas
- Worland, Wyoming


A FIRE PROTECTION SYSTEM
is as good as its WATER SUPPLY
Don't get caught with a water supply that is too little and too late. A Horton* elevated tank will provide your sprinkler system with a dependable gravity pressure water supply that is always ready to flow—day and night. Your plant will have the protection it needs . . . and elevated tanks often pay for themselves quickly in reduced insurance premiums.
Write our nearest office for further information on a Horton elevated tank for your plant.
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Change motors in minutes—

No long and costly "down time" involved

Motors can be interchanged or replaced *in minutes* with the all-steel, All-Motor type FALK Motoreducer. No long and costly "down time" is involved in making the change!

Best of all, replacement is not limited to original make of motor—new NEMA frames may be substituted for old. This versatile Motoreducer operates with any make, speed or type of standard foot-mounted motor within its AGMA rating. No modification, no special shaft, no "partial" motor required.

In addition to unmatched motor interchangeability, this dependable gear drive—the "work horse of industry"—offers: widest choice of output-shaft position (horizontal, vertical, right-angle)...any output-shaft connection...any mounting, including wall and ceiling...standard speed range from 1.5 rpm to 1430 rpm. All these advantages, plus proved efficiency, low maintenance and extra-long life, make the All-Motor type FALK Motoreducer your best buy for any job requirement.

Furnished in sizes up to 75 hp with any make, style or type of motor; or, *without a motor if desired.* FALK Motoreducers are available from convenient factory, field or distributor stocks, from coast to coast.

Write for Bulletin 3100

THE FALK CORPORATION, MILWAUKEE, WISCONSIN

MANUFACTURERS OF:

- Motoreducers
- Speed Reducers
- Flexible Couplings
- Shaft Mounted Drives
- High Speed Drives
- Special Gear Drives
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FALK "IN-BUILT" FACTORS assure full dependability—better service—longer life

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Rugged, strong, rigid ...all parts heavy steel plate, formed and welded in the Falk Weld Shop.

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Large shafts, oversize bearings...rigid mountings with wide bearing spans to handle maximum loads.

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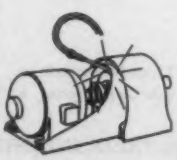
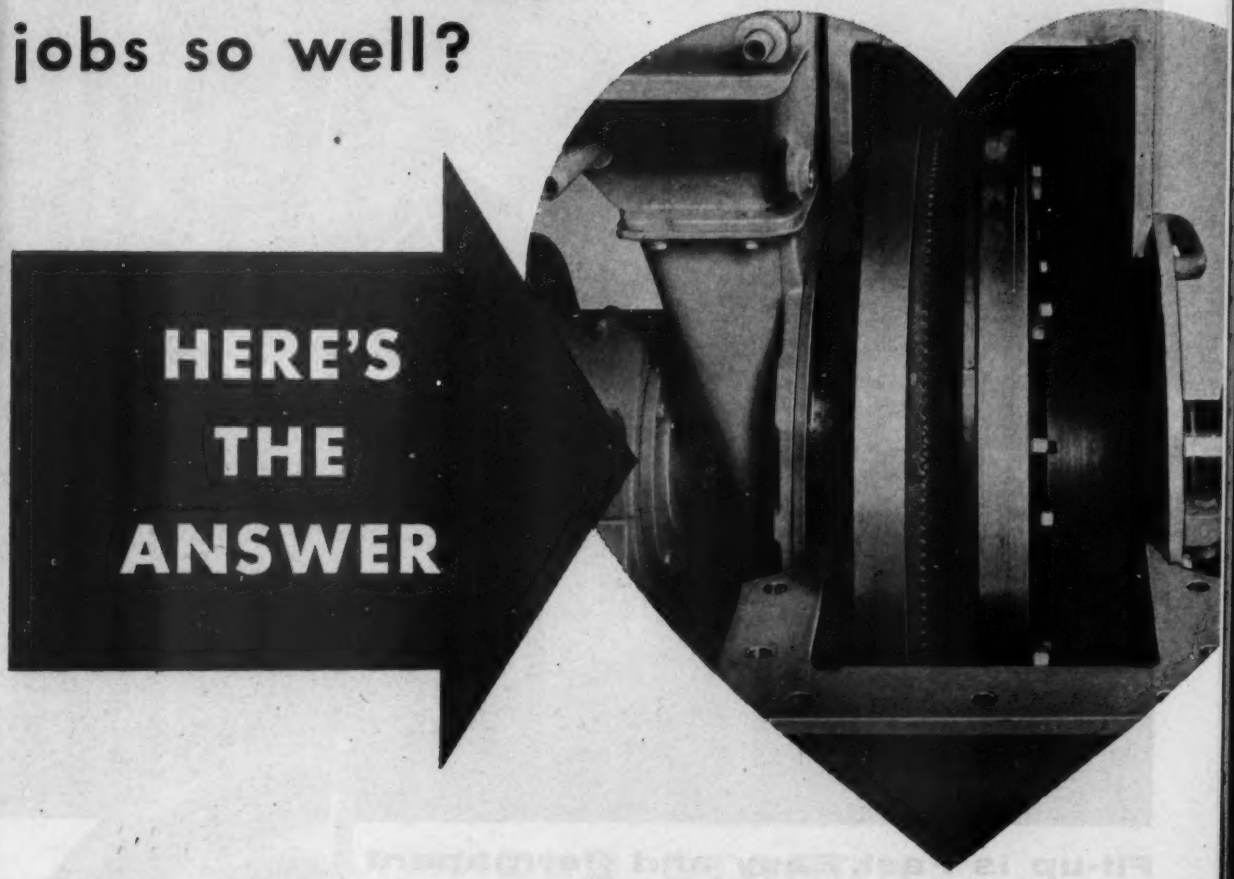
Heat-treated alloy steel gearing, precision cut and shaved after heat treatment to eliminate distortion.



SEALED HOUSINGS

Splashproof, dustproof, oiltight. Dual closures and one-way vents keep oil in, dust and moisture out.

How is it Bauer Double-Disc Refiners can do so many jobs so well?



Two Revolving Discs

In a Bauer Double-Disc Refiner, each disc is separately powered by a built-in motor. These discs revolve in opposite directions, giving the plates high surface speed with minimum machine speed. This explains why the refiner (1) Fiberizes best; (2) Produces more uniform fiber; (3) Brushes out shives best; (4) Makes far less chop; (5) Disperses stock best.

For these reasons, Bauer Double-Disc Refiners are preferred on . . .

Semi-chemical pulp • Hi-yield sulphite pulp • Groundwood screenings • Mechanical ground-wood from chips • Dry-formed board furnish • Asbestos processing • Starch refining

All of these statements are readily provable from actual operating experience.

In many cases, single-revolving-disc refiners are indicated for the desired results. We manufacture them, too, in both pressure and free discharge types.

You are invited to write, wire, or phone us for literature and data on Bauer Refiners. Phone number is FAirfax 3-5501.

Bauer

The Bauer Bros. Co.

DISC REFINER HEADQUARTERS

1759 Sheridan Ave. • Springfield, Ohio

Fit-up Is Fast, Easy and Permanent with B&W CROLOY Elbows

THIS end-use required welding fittings resistant to heat and corrosion—*plus* economical fabrication. B&W CROLOY 5 was chosen to meet service requirements. Dimensional accuracy and uniformly beveled ends of B&W Elbows simplified the welding procedure.

CROLOY 5 is one of a complete series of chromium molybdenum alloy steels developed by B&W to meet varying conditions of corrosion and oxidation in elevated pressure service. Further information on CROLOY 5 is available in B&W Bulletin 146.

B&W Alloy Welding Fittings and Flanges reduce fabricating time because they provide positive alignment at joints and are quick and easy to weld. B&W Bulletin 502 gives complete information.

THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION • FITTINGS DEPARTMENT
3039 WEST BURNHAM STREET • MILWAUKEE 46, WISCONSIN

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Seamless welding fittings and flanges, seamless and welded tubular products—in carbon, alloy and stainless steels

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ANHEUSER-BUSCH, INC.

Sign of highest quality

GUMS
For tub sizing, coating and calendering.

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Standard and special for beaters, tub sizing, coating and corrugating.

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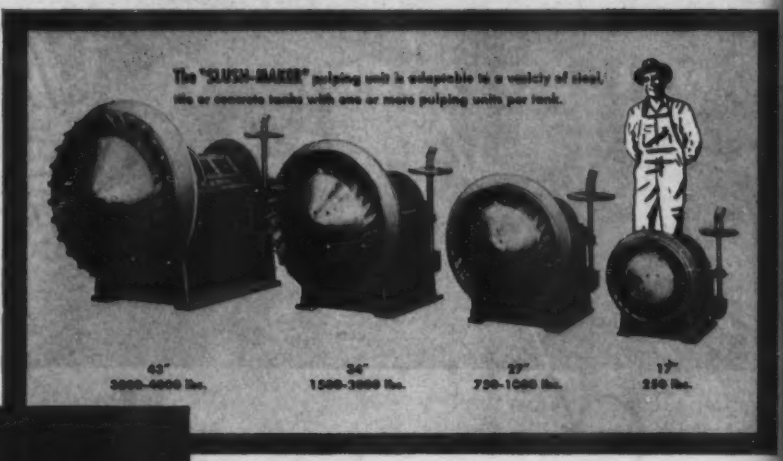
MORDEN SLUSH MAKER®

Patented

For Pulping

The Morden "Slush-Maker" can be used for either continuous or batch operation. Whichever method is used, there is a rapid defibering.

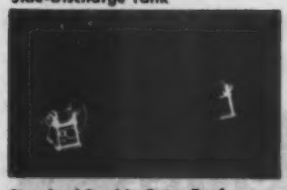


These thumbnail sketches show some of the many tanks that can be designed to suit specific mill requirements.

Dry-End Continuous Broke Pulper with Single Rotor

Low-Headroom—Side-Discharge Tank

Special Single-Wall Cylindrical Tile Tank



Standard Double-Rotor Tank for Larger Capacity

Special Cylindrical-Top Steel Tank

Dry-End Continuous Broke Paper Pulper with Double Rotor

Standard Tank with Special Charging Port

Advantages

- **Full Bales or Slabs** can be charged by hand, lift truck or conveyor.
- **Dry-End Broke** can be handled continuously, directly under the paper machine.
- **Wet-Strength Papers** are readily reclaimed with the "Slush-Maker".
- **Rapid Pulping Action** permits greater production per day.
- **Operation** can be batch or continuous.
- **Vigorous Circulation** thoroughly mixes the colors and chemicals in less than a minute.
- **Completely Cleared Stock** reduces amount of beating and jordaning treatment required after pulping.
- **Tramp Materials** will not damage or bind the pulping unit.
- **Side-Mounted Pulping Unit** permits low-headroom applications, simple drives.

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ORTON CORPORATION, Fitchburg, Massachusetts

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Consult this Booklet

FLEXOGRAPHIC, ROTO, OIL INK PRINTING PRESSES

WET OR DRY WAXING MACHINES

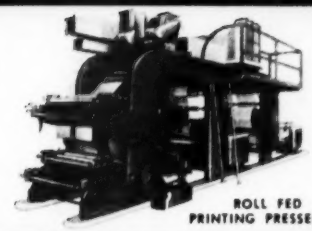
LAMINATING AND GUMMING MACHINES

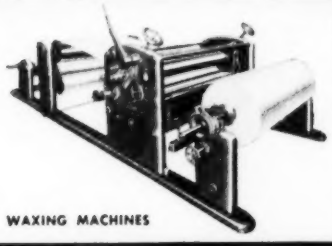
PAPER ROLL AND PACKAGE CUTTER

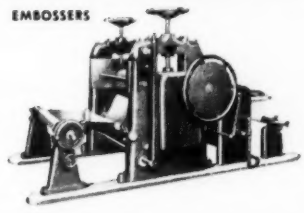
ROLL WINDERS, FOLDERS, SHEETERS

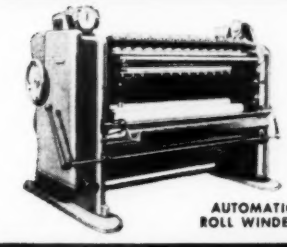
EMBOSSERS AND DIE INKING MACHINES

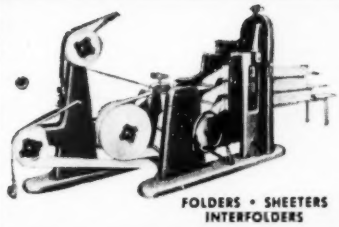
WRAPPING MACHINES

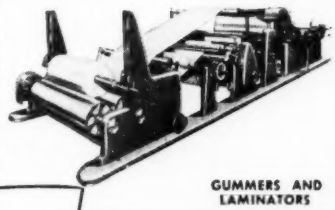

ROLL FED PRINTING PRESSES

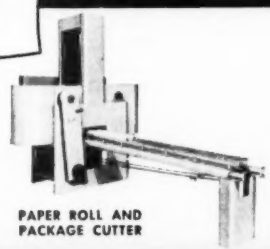

WAXING MACHINES


EMBOSSERS


AUTOMATIC ROLL WINDERS


FOLDERS • SHEETERS INTERFOLDERS


GUMMERS AND LAMINATORS


PAPER ROLL AND PACKAGE CUTTER

FOR *Precision Engineered* PACKAGING PROCESS EQUIPMENT

Paper, film or foil — If your converting or processing problem is one of Printing, Embossing, Laminating, Waxing, Creping, Folding, Winding or Wrapping you'll find a Hudson Sharp Machine especially designed for the job. Write today for latest machinery brochure which illustrates and describes our complete line.

Get this Booklet, too—

It illustrates and describes the operation of the automatic CAMPBELL WRAPPER — industry's most amazing high speed packaging machine. Learn how you can increase production and effect savings in time, labor and materials.

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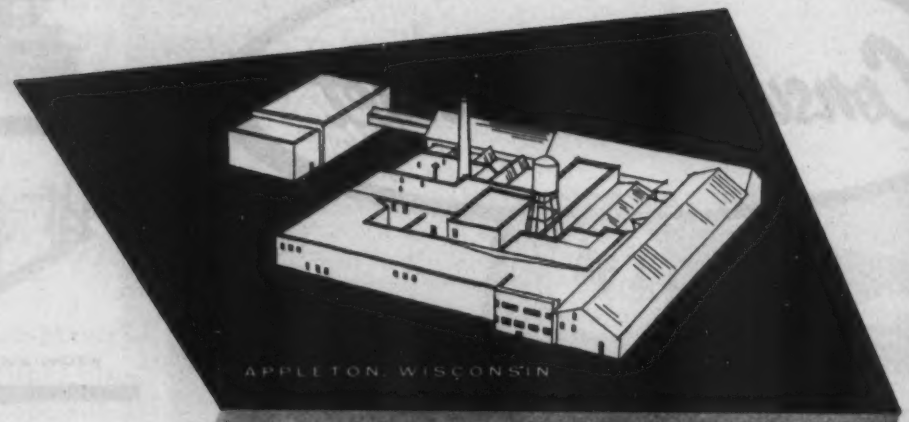
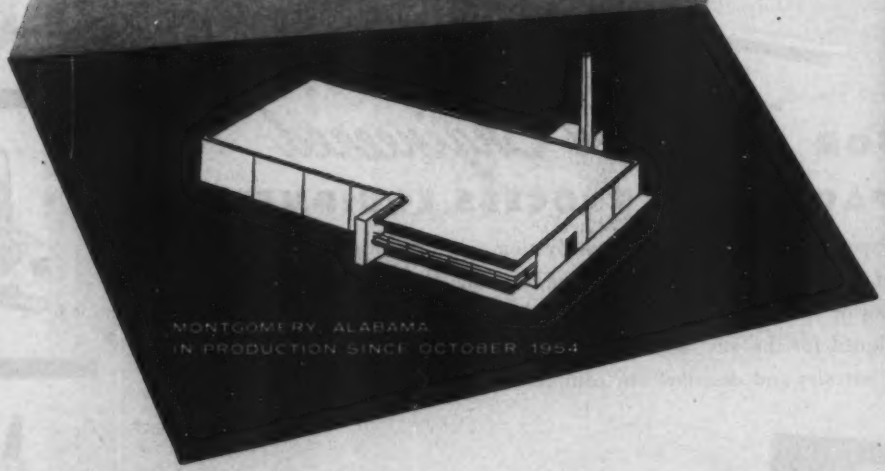


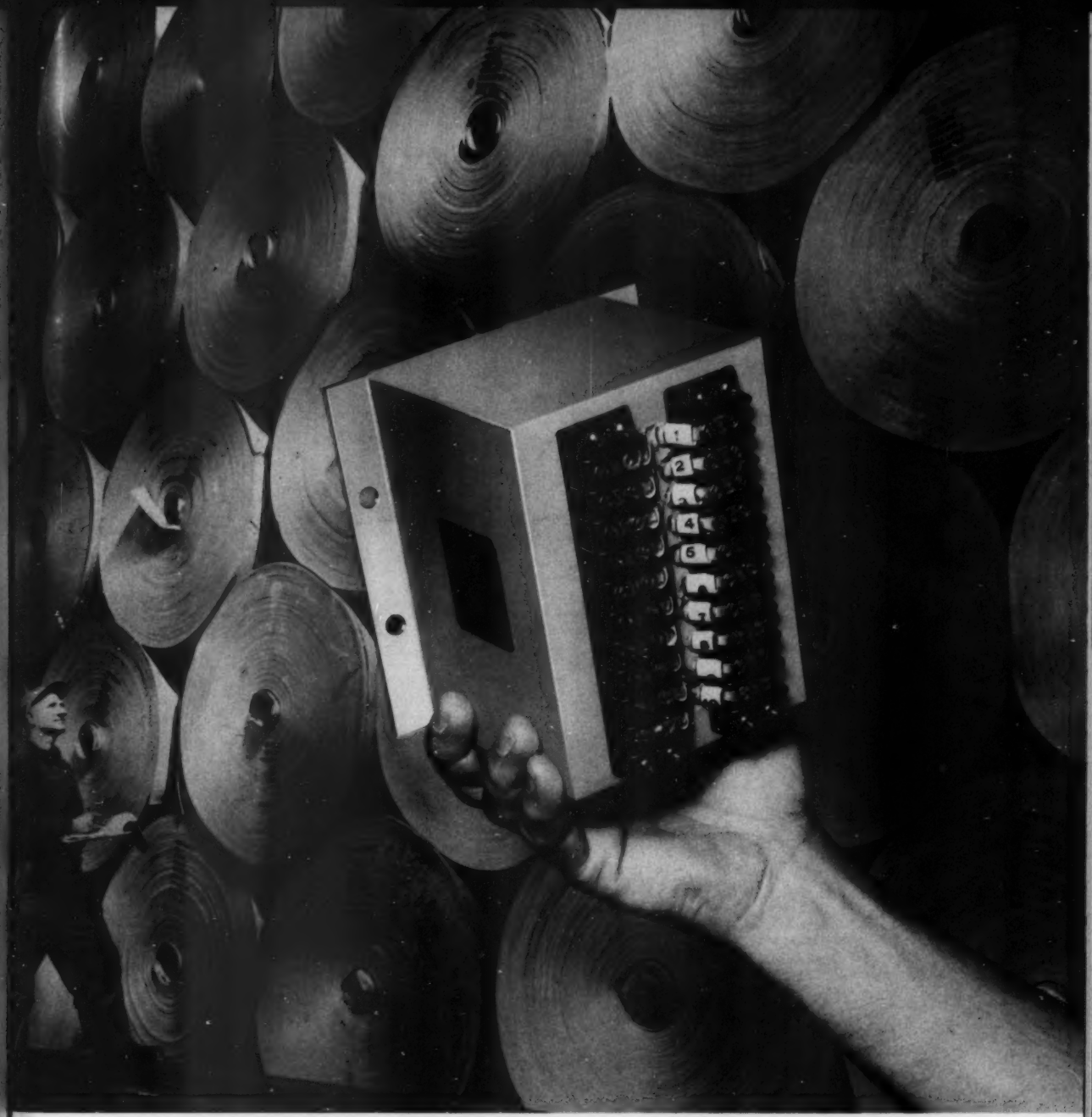
Confidence....in the paper industry

Foresight.....to anticipate changing conditions and requirements of the paper industry with new manufacturing facilities



Appleton Wires are Good Wires

Appleton Wire Works, Inc.
GENERAL OFFICES, APPLETON, WISCONSIN



SIMPLIFIED CONTROL

for high-speed paper finishing . . .
with Westinghouse MAGAMP regulators

Westinghouse Magamp* magnetic amplifier regulators permit you to operate finishing machines at maximum speeds without sacrificing paper quality. Their demonstrated *high availability* assures you reduced down time, while providing precise control and coordination of required machine functions.

*Trade-Mark

Here's why Westinghouse Magamp regulators are proved standards for the paper industry →

WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING **TODAY!***

Automatic speed and tension control boost finishing machine production

In winding operations, costly time-consuming paper breaks, spoilage and unevenly wound rolls are minimized with Westinghouse Magamp regulators. They provide smooth acceleration and deceleration under current-limit control. Where electric braking is used, Magamp automatically holds constant tension over the operating cycle as the roll on the unwind stand changes its diameter.

Supercalender production is also boosted with Magamp. Controlled tension during acceleration and deceleration reduces paper spoilage and cuts time needed to get your supercalender from threading to productive speed. One man has complete control of the drive from one operator's station.

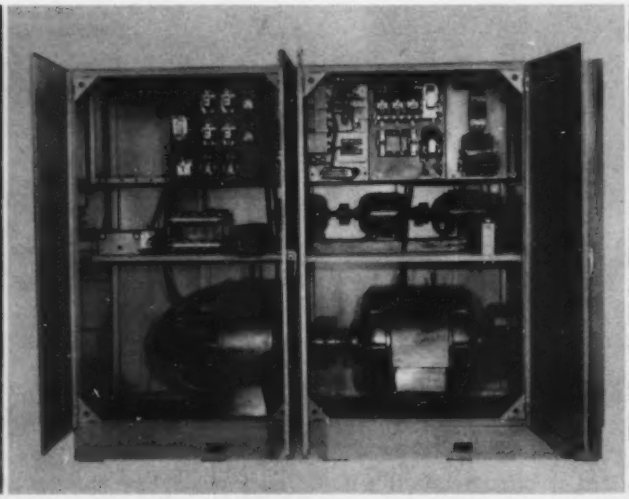
Magamp regulators are ideal for paper finishing and converting processes requiring tandem operation of several machine sections. Included here are coaters, corrugators, winders, roofing machines, and others such as combination paper-treating and air-drying equipment.

Magamp regulators are reliable, provide high gain and quick response . . . with virtually no maintenance. They are rugged, efficient, completely static . . . have no moving parts. Magamp units are panel mounted and factory wired for easy installation.

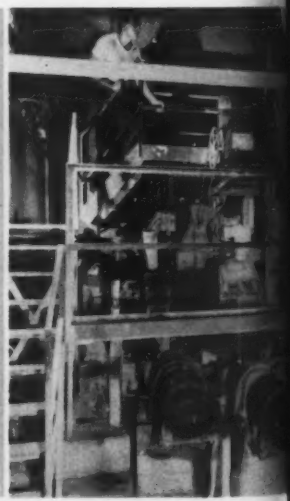
WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING **TODAY!***

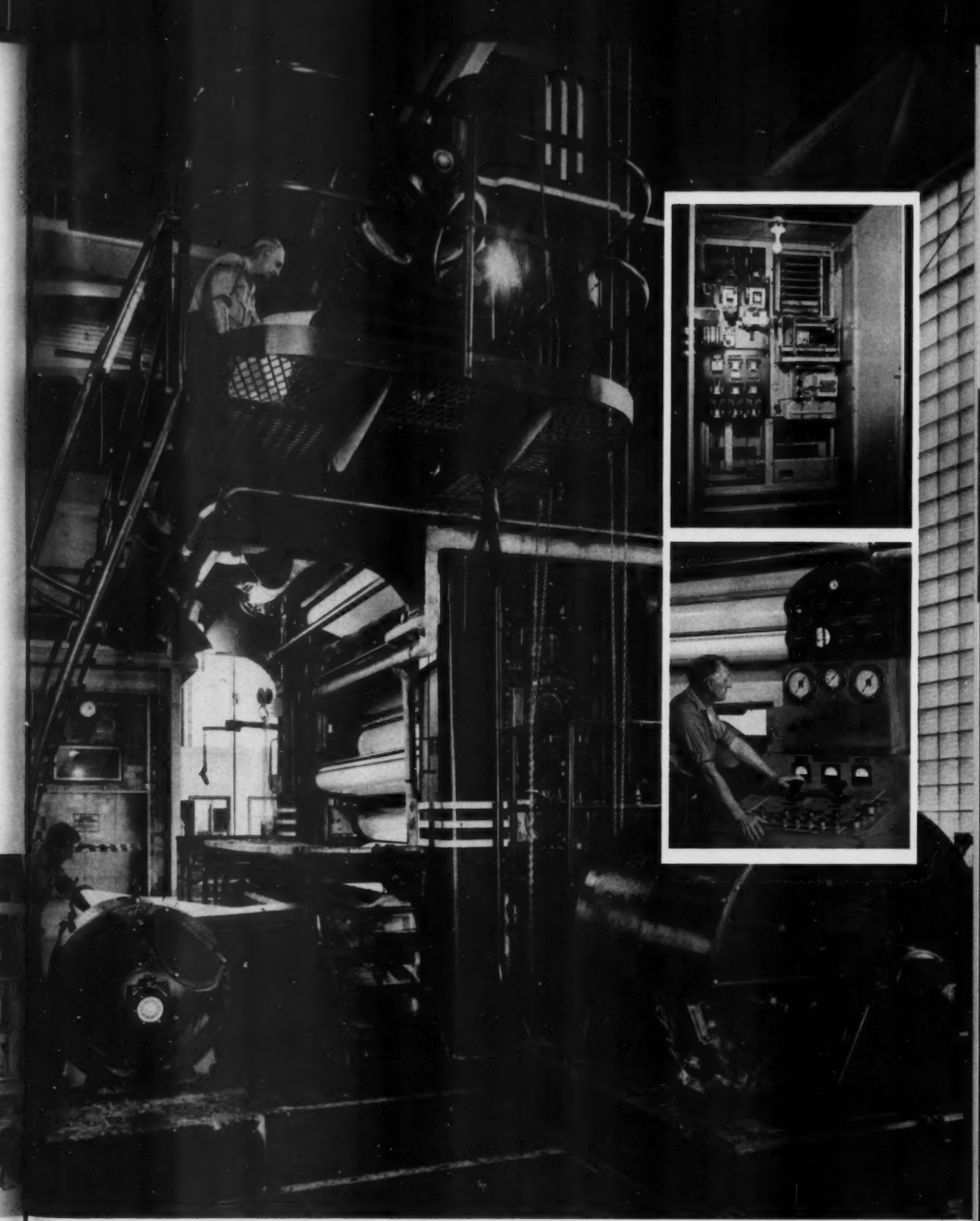
On single or double-facer corrugators, constant speed relationship between adhesive roll and board speed is automatically controlled over the entire operating range.



AV Drives with Magamps provide versatile speed adjustment, easily adjustable from inching speeds for setups and threading to fast runs for high production. No tubes to replace — no moving regulator parts to wear out.



Magamp regulators applied to coater drives assure accurate speed matching over the operating range. Once set, Magamp automatically maintains correct speed with no further attention from operator.



On supercalenders, Magamp regulators provide uniform threading speed and permit smooth transition to operating speed. They lower operating costs by minimizing cuts and sheet wrinkles, even at maximum speeds.

Magamp panel mounted inside control cubicle (inset top right) has high amplification characteristics which make it an accurate, effective control device. Complete control of supercalender achieved from one operator's station.

Mile-a-minute single motor-type winder drive wi
electric braking unit on the unwind stand. Conside
power and maintenance savings will result in ope
of the drive with this combination.

Mile-a-minute winder produces finished rolls faster

Speeds of better than a mile a minute are now possible with winders equipped with Westinghouse magnetic amplifier regulators. This simplified control provides more convenient operation, improved drive performance, lower operating costs. Result: more finished rolls . . . faster.

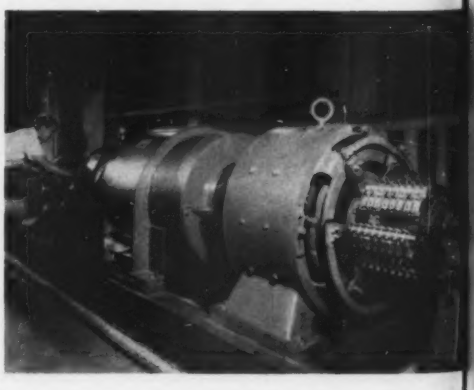
Westinghouse drives maintain speed accurately and hold uniform sheet tension automatically, thereby reducing unevenly wound rolls and off-quality paper. Smooth control of acceleration and deceleration reduces breakage and outage time for rethreading.

An experienced Westinghouse team will work with your engineering staff and consulting engineers in setting up your drive assemblies. Westinghouse designs and manufactures all the electric equipment including speed reducers for complete drives . . . and accepts undivided responsibility for the drive's successful operation.

Contact your Westinghouse sales office for further details. Or write Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pennsylvania.

Operator's station provides centralized control of all winder operations. A main control cubicle provides all magnetic control including the Magamps.

The Westinghouse coordinated winder m-g set design is demonstrated by this assembly. Main d-c generator in foreground, a-c synchronous drive motor, booster for braking generator and exciter for complete drive.



WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING **TODAY!***

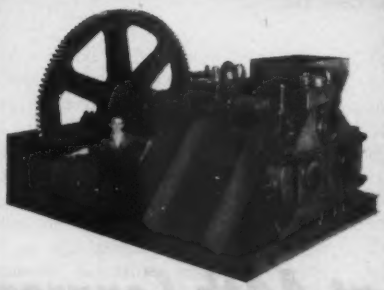
MP-30

solve your burning question!

MAKE PROFITABLE FUEL FROM WET BARK

WITH A **FULTON ROLL PRESS**

The photographs show how a Fulton Roll Press de-waters and reduces mill refuse into efficient fuel... ALL IN ONE CONTINUOUS OPERATION.



Water is squeezed from bark containing 70% moisture and averaging only 5,582 BTU's per pound.

Dry fuel containing only 47% moisture and averaging 7,390 BTU's... ready for economical burning.

FEED WASTE INTO THE HOPPER
WATCH DRY FUEL POUR OUT

The Fulton Roll Press will rid your plant of soggy bark, knots, screenings and other fibrous material. And this process costs far less than inefficient "batch" methods.

It took FULTON... with over 104 years experience in dehydrating fibrous material for the sugar industry... to develop the remarkable Roll Press.

MAKE US PROVE IT ON YOUR MATERIAL...

Mail coupon now for full details and FREE TEST RUN of materials you want to process.

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Dept. PI-11 • 4235 Duncan Ave. • St. Louis 10, Mo.

Please send full details of FULTON ROLL PRESS.

We are interested in FREE TEST RUN of.....

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HYDRAULIC MACHINERY CO., LTD.
1243 Dorion Street
Montreal, Quebec
(Canadian Licensee)

FRITZ TROPHY for outstanding safety achievement is awarded to the Newcastle, N. B. mill of Fraser Companies Ltd. Receiving the plaque for his firm is Don A. Adams (r), mill electrical superintendent and chairman of the general safety committee. Making the presentation is A. Scott Dowd, president of Fritz Publications Inc., donor of the trophy.

ARTHUR HOYT Scott Award is given Minnesota & Ontario Paper Co., represented here by D. L. Eisenach (r), safety director for the firm. Presented annually by Scott Paper Co. for safety accomplishment, the trophy is here being presented by Claire L. Lyon of Scott (c). Representing last year's winner is Julius A. Draper of Consolidated Paper Corp. Ltd.

Feature articles

Pulp and paper safety discussed at 44th Congress

▶ Management is responsible for safety in the mill . . . Fraser and Mando win major awards . . . frequency up over 1954-55 . . . no-injury accidents vs. injury accidents . . . and labor's part in safety

SALES PROMOTION is vital to the success of an accident-prevention program whether it be in the mill, in the home or on the highway.

That was the view expressed in October by R. J. Askin as he keynoted the opening meeting of the Pulp & Paper Section at the 44th National Safety Congress in Chicago.

Some 200 safety leaders representing pulp and paper firms from throughout the United States and Canada attended the sessions, which were held at the Conrad Hilton Hotel.

Since management today accepts the primary responsibility for safety, Askin declared, accident prevention must begin at the top. The speaker, who is vice president for manufacturing of Abitibi Power & Paper Co. Ltd., said that nothing promotes the cause of safety more than an "awareness of safety." And the job of promotion is the task of top management.

Soughton new chairman

Named general chairman of the Pulp & Paper Section for the 1956-57 year was F. O. Soughton, services and safety supervisor for LongLac Pulp & Paper Co. Ltd. at Terrace Bay, Ont. He succeeds Francis H. Wagner of the Mead Corp. at Chillicothe, Ohio.

Other principal officers elected to serve during the coming year include: **Vice Chairman and Program Chairman,** Earl F. Ripstra, personnel manager for Container Corp. of America in Chicago; **News Letter Editor,** R. G. Belknap, personnel manager for Bemis Bros. Bag Co. in East Pepperell, Mass., and **Secretary and Membership Chairman,** George R. Merriman, safety coordinator for the Southern Kraft Div. of International Paper Co. in Mobile, Ala.

Safety: a sales job

Because the vast majority of accidents are due to human failure,

DISCUSSING the opening session of the Pulp & Paper meetings are (l to r) D. V. Hill, James F. Smith and Francis H. Wagner, all of the Mead Corp., and Robert M. Gilmore of Rayonier Inc. (Wagner was 1955-56 general chairman of the section, while Gilmore held the same post in the Wood Products Section.)

PULP AND PAPER safety leaders from throughout the United States and Canada attended the Chicago meetings. Typical are (l to r) E. W. Brown of International Paper Co.; R. W. Gray, Union Bag-Camp Corp.; E. F. Torkarz, Chesapeake Corp. of Virginia; Dallas E. Henry, Robert Gair Co. Inc., and J. P. Dixon of Chesapeake.

Askin warned in his opening address, employees must be made aware of safety. Making them aware is a pure and simple task for good sales promotion: from top management to the supervisor to the foreman.

Safety is the product being sold by management; and it must be sold as well as the product is sold to the consumer. Scientific selling methods must be used and used efficiently.

Management's responsibility, Askin concluded, is to set up conditions and thinking conducive to safety. To demonstrate this principal, Abitibi Power & Paper has produced the movie, "It's in the Cards," which depicts that firm's plant safety program in action. One effect that the film has had, the speaker concluded, has been to bring about standard safety conditions throughout the Abitibi mills.

The movie was shown following Askin's talk.

Fraser and Mando win

Safety performances in 1955 gained for Fraser Companies Ltd. and Minnesota & Ontario Paper Co. the two major awards that are the highlights of the annual gathering of the Pulp & Paper Section.

Winner of the coveted Edward Benton Fritz Memorial Trophy for the second consecutive year was the Fraser mill at Newcastle, N. B. As of June 1 of this year, the plant's last reportable injury had taken place on December 8, 1952; and through December 31, 1955, the accident-free man-hours totaled 1,706,152.

For the contest year alone, man-hours worked at the mill came to approximately 235,072.

The trophy was accepted for the Newcastle operation by Don A. Adams, mill electrical superintendent and chairman of the general safety committee. Donor of the award is THE PAPER INDUSTRY, and A. Scott Dowd, president of Fritz Publications Inc., made the presentation.

The third annual presentation of the Arthur Hoyt Scott Award was made to Minnesota & Ontario Paper Co. with mills at International Falls, Minn., and at International Falls and Kenora, Ont. It was accepted for Mando by D. L. Eisenach, safety director for the firm.

Scott Paper Co. is donor of the trophy, which is given each year to that company whose operations *in all its plants combined* result in the safety record considered by the contest judges to merit recognition.

24th among 40

In his annual statistical report of the contest year, Dowd disclosed that the 1955 record for all pulp and paper firms reporting to the National Safety Council was 8 per cent higher than in 1954. The 1955 accident frequency rate, he said, was 7.78. Pulp and paper thus ranked 24th among the 40 industries reporting to the NSC.

According to the speaker, who is chairman of the section's contest committee, 518 contestants finished the 1955 contest with ranking positions. These consisted of 306 pulp and paper mills, 200 remanufacturing plants and 12 pulpwood logging units. The total exposure was 562,785,000 man-hours — an increase of 10 per cent over the previous year. There were 5367 reported injuries.

The cumulative frequency rate for Divisions I and II, he continued, was 7.64, which was 3 per cent higher than the final rate for these divisions in the 1954 contest. The cumulative rate for pulpwood logging was 81.84

KEYNOTING THE opening session is R. J. Askin, vice president for manufacturing of Abitibi Power & Paper Co. Ltd.

LUNCHEON speaker was Paul L. Phillips, president of the International Brotherhood of Paper Makers.

ACCIDENT prevention in pulp cooking was discussed at the pulp manufacturing symposium by (l to r) Peter K. Bloch of Bransom Instruments Inc., M. H. Winchester of Travelers Insurance Co. and Bernard F. Smith of Kimberly-Clark Corp.

NEW OFFICERS of the section include (l to r) R. G. Bellnap, news letter editor; F. O. Soughton, general chairman, and Earl F. Ripstra, vice chairman and program chairman. Absent: George R. Merriman, secretary and membership chairman.

PULPWOOD LOGGING came under discussion by (l to r) C. C. Wright of Spruce Falls Power & Paper Co. Ltd., C. S. Miller of Manitoba Paper Co. and D. B. Chant of the Ontario Pulp & Paper Makers Safety Association.

INFORMAL discussion during one of the sessions: George Gribble and C. W. Wilson, both of the National Container Div. of Owens-Illinois Glass, and James Emerich of Mosinee Paper Mills Co. at Mosinee, Wis.

— a decrease by identical units of 17 per cent.

Some 322 contestants — 62 per cent of the total — had frequency rates below 10; while 44 units consisting of 20 mills and 24 converting plants completed the contest with perfect scores.

A total of 142 contestants, aside from group winners, Dowd concluded, had freqency rates below their averages and also showed reductions by comparison with their rates for the previous contest.

The West Coast story

That safety is of the same importance as the quality and quantity of production was the view expressed at the opening session by S. W. Grimes, secretary of the Pacific Coast Association of Pulp & Paper Manufacturers.

There was no worker interest in safety (officially), he said, prior to 1946, when his association instituted its annual labor-management safety conferences. Prior to that time, safety had been a management concern.

Since the inauguration of the conferences, the speaker declared, accident-prevention is the concern of labor and management alike because the worker now has a vital role in the safety program.

The aim of the annual meetings, Grimes explained, is primarily that of educating old and new employees alike in the ways of working safely.

The "why" of safety

George W. Harper, an associate professor of mechanical engineering at the University of Illinois, in his address listed the six "whys" of accident prevention:

(1) Humanitarianism; (2) the direct cost of injuries; (3) the indirect cost of injuries — cost of the first aid service, of the co-workers and the supervisor, of the investigation, etc.; (4) the cost of accidents — *not merely those involving injury, but all accidents;* (5) improved employer-employee relations, and (6) better public relations.

The three tools for accident prevention, according to Harper, are: engineering, training and *promotion.*

Emphasizing promotion, the speaker declared that unsafe attitudes are changed through the techniques of sales promotion: (1) Advertising, (2) posters, (3) bulletin boards, (4) signs, (5) stunts, (6) contests, (7) campaigns, (8) certificates, (9) plant publications, and (10) suggestion systems.

"An effective method of applying these safety tools is like a chair," Harper concluded; "it must have four legs to stand on or it will not be worth using." The four "legs":

"(1) Top management leadership; (2) supervisory responsibility; (3) employee participation, and (4) delegated safety authority.

Right man, right job

That the man should be chosen for a particular job not only because of his mental ability but also because of his physical ability was the theme stressed by R. L. Quimby at the second general session. Quimby is medical director for loss prevention medical services of Liberty Mutual Insurance Co.

The physician and the personnel director, he said, should work hand-in-hand in placing an employee on any particular job. Such a method of job placement will accomplish two ends. It will (1) increase production and (2) reduce accidents.

Modern industry, Quimby explained, must use the following "preventive medicines": (1) Annual physical examinations; (2) health advice for employees; (3) health education; (4) plant hygiene; (5) the employment of a full- or part-time nurse or physician, and (6) constant consultation between plant and management as to the status of each employee.

Noise as accident cause

Mill noise as an important cause of accidents was discussed by Ralph H. Caston, physicist for Kimberly-Clark Corp.

In addition to the direct importance of noise as a safety factor, Caston pointed out that it can be an indirect cause of mishaps through fatigue and loss of hearing. In addition, it can and does reduce worker morale.

Among the methods of noise reduction discussed by the speaker were: (1) the Abbott & Kraus silencer for the suction roll; (2) acoustical floors and ceilings; (3) shock mounts for motors; (4) soundproof enclosures; (5) commercial screening, and (6) ear plugs for workers.

Regardless of such equipment, however, the speaker concluded that only

(Continued on page 691)

On page 689 is an article dealing with the safety program at the Fraser Companies Ltd. plant in Newcastle, N. B., winner of the 1955 Edward Benton Fritz Memorial Trophy.

Color in the paper industry

DR. W. SCHWEISHEIMER

Color is an important tool in accident prevention; its use also increases production and improves morale

INDUSTRY TODAY MAKES USE OF COLOR in all its branches. Color actually sells production. Fortune magazine has compiled a number of opinions of industrial users of color as follows:

"The new color scheme has reduced eyestrain and physical fatigue among our employees", says one industrialist. "We have noted a definite improvement in production", reported another. A paper manufacturer stated that "the cleaner, better-lighted, and the more pleasant mill attracts a higher type of workers both for executive and production jobs." Another industrial observer said that a "20 per cent reduction in absenteeism is directly traceable to the new color plan."

Colors increase production 15 per cent

Some ten years ago it was a bold venture when machinery makers were asked to paint machines a light French gray, because some clients preferred this to the normal black. Today everywhere bright pigments take the place of the drab hues of past days. Color, more than at any time, is an important factor in the construction of mills and the interior or machine shops. Experts in color psychology have discovered that workers are in a better mood and consequently more efficient when they are working in gaily painted surroundings.

The experiences of Ronald J. Cooke are proof for the psychological influence of colors on the working man. No more gray uniform-like monotony, but colorful surroundings and tools even in smaller buildings of the pulp and paper industry. Tests have shown that a new color scheme can increase production by as much as 15 per cent. This increase of production may be much higher in special cases.

There is no reason to go to the extremes. Very colorful surroundings may be pleasant to the eye, but it is wiser to let colors be passive in order to avoid competition with the job. Faber Birren, an expert in color technique, says wall tones in direct lines of vision should be held in pale hues having about 40 per cent reflectance. Tones very soft and grayish, preferably "cool" in quality, are recommended. If color is too rich or too vivid, the worker's attention may wander from the task.

Birren's prescriptions stress the need to keep machine colors only slightly darker or lighter than those of materials. This is important when you have to work with the whiteness of paper. Contrasts should be effected through hue rather than extreme lightness or darkness. Soft grayish tan, he points out, will help build up sensitivity for the normally bluish casts of steel; soft grayish blue will heighten sensitivity for the orange cast of brass, etc.

Glare of colors on machines

Color for machinery should generally have a reflection value of from 25 to 40 per cent. A study of machine colors in the United Kingdom showed that there has been a notable trend in all new installations to use glazed bricks in gay shades and to paint lighter shades, even on older erections.

Light restful colors have been found the most attractive ones from the worker's viewpoint, according to extensive experiences, and the changes made have been as much for the purpose of being restful to the workers as to show up dirt. Anything assertive was found to impair production and glaring colors are being avoided.

Jones & Laughlin recently recorded a sharp drop in absenteeism, turnover, and accidents as well as a satisfying efficiency increase over a two-year period after a color scheme installation. They are of the opinion that "an appreciable portion of this achievement can be directly attributed to the color program."

Safety color code

The following is the classification contained in the American Standards Association Safety Color Code which is used as a basis in other countries as well:

1. Red is used to identify fire protection equipment or its location, flammable liquid containers, emergency stop buttons or electrical switches, etc.
2. Yellow or yellow and black stripes are recommended for marking hazards that may result in accidents from slipping, falling, and bumping into objects.
3. Green with white designates the location of first aid and safety equipment such as shelters, gas masks, bulletin boards, etc.
4. Black and white is used for housekeeping and traffic markings. Three other colors have been proposed as an addition to the Safety Color Code. They will probably be included in later editions of the Code.
5. Orange, to attract attention to special hazards or guards out of place.
6. Purple for radiation hazards.
7. Blue for caution, to be used at power sources, etc.

Color improves plant morale

The right colors and color combinations in your homes, offices, plants, and travel accommodations are highly important both for health and efficiency. Repainting a plant interior in the proper colors increases production. Bright, light colors have a stimulating and cheerful influence on most people. They produce very much the same effects as would friendly words of encouragement.

Drop in accidents due to repainting

In a paper mill a sharp drop in minor accidents as well as near injuries was produced by the use of new paints. Machinery had been painted before to indicate danger spots. Those were the spots where serious accidents could occur. But what about so-called minor spots?

Every corner, stairs, railing, and exposed machine parts were painted, according to the advice of R. H. Primm. Throughout the mill, wide focal orange strips were painted on posts and corners. Electric switch boxes got coats of orange paint. Wide orange strips on column indicated motor switches, while narrow orange

(Continued on page 682)

Beta gauges at the wet end*

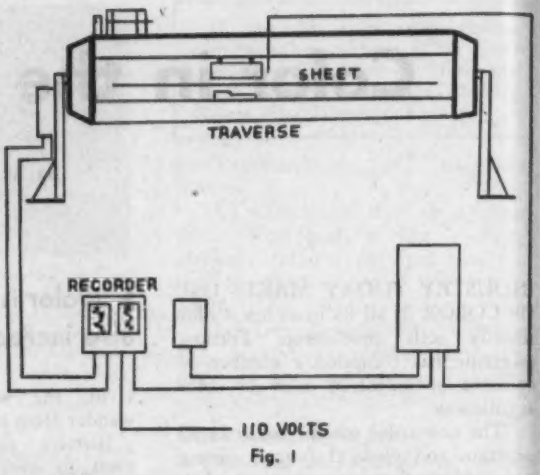


Fig. 1

Beta gauges at the wet end permit optimum setting and adjustment of presses, vacuum, and vacuum boxes; tying the wet and dry end gauges into a differential system offers interesting possibilities in moisture control.

A. L. PETITJEAN

Western Dynamics Co., Seattle, Washington

BASIS WEIGHT MEASURING systems using radioactive isotopes are commonly known as Beta gauges (Fig. 1). They are installed directly on the paper machine and can be made in units to traverse the entire web. The radiation emitted normally consists of beta particles which are high speed electrons. The system consists of a radioactive source placed on one side of the sheet to be measured, and opposite the source on the other side of the sheet a radiation detector is installed which receives the rays that are passed through the sheet. This detector indicates the intensity of the radiation received and is translated by appropriate scales into basis weight. The absorption of the radiation by the sheet varies with the weight per unit of the sheet. No active radiation is left in the sheet.

The weight measured by Beta gauges constitutes the total weight of the sheet. Therefore, the fibers and moisture content are measured together. For example, on a 100-lb. per ream sheet, the measurement read could be 95 per cent stock and 5 per cent moisture. The reading obtained by the Beta gauge would be 100 lb. per ream. The gauge does not differentiate between moisture and the paper stock. Gauges located on the dry end of a paper machine monitor the continuous total weight of the sheet. These readings correspond to the actual basis weight measurements now taken by present methods of weighing on a balance. The advantage of the nuclear measurement system is the continuous measurement, and therefore the immediate detection of the slightest variation.

Wet end measurement

There exist other areas where continuous measurement of basis weight can be extremely advantageous to the papermaker. Since a paper machine is fundamentally designed to remove water from the web, measurement at the wet end can offer tremendous advantages.

Continuous measurement of the sheet at the wet end of the machine, between the presses and the dryer, offers the possibility of controlling any of the variables which contribute to total weight. For example, the total weight of the sheet in this area could be one-third stock and two-thirds water. Therefore a 100 lb. ream dry sheet would record as a 300 lb. ream on the wet end.

Continuous measurement at the wet end can be used to make equivalent basis weight changes on the dry end. Using the example of a 100 lb. dry end ream and a 300 lb. wet end weight, a 3 lb. total weight change on the wet end would be equivalent to a 1 lb. weight change on the dry end. In an automatic control system, tying in the wet end weight as a controller would result in a faster stuff-gate correction than would be possible on the dry end, because of the lag in the amount of material in the dryer.

Fig. 2 is an example of changing the basis weight by 11 pounds on the wet end, and a resultant change of 3½ lb. on the dry end.

Corrections for other variations can be made on the wet end. Fig. 3 is an example of correcting the sheet edge of a 50 lb. natural kraft paper. In a matter of ten minutes, the machine operator was able to smooth out the wide variations by using the Beta

*An abridgment of a paper entitled "Controlling Wet End Dryness by Total Weight Measuring with Beta Gauges" by A. L. Petitjean presented at a joint APPMSA and TAPPI meeting in Gearhart, Oregon.

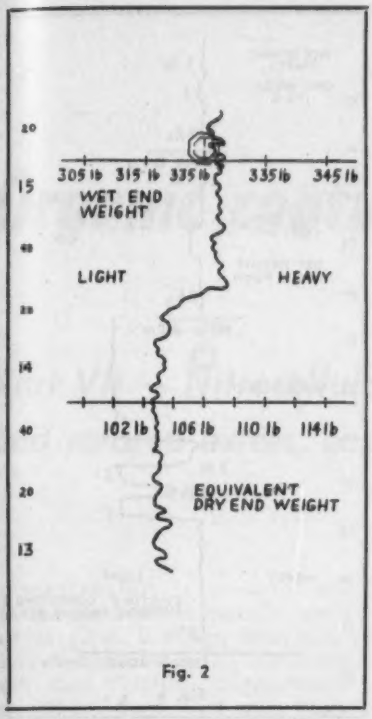


Fig. 2

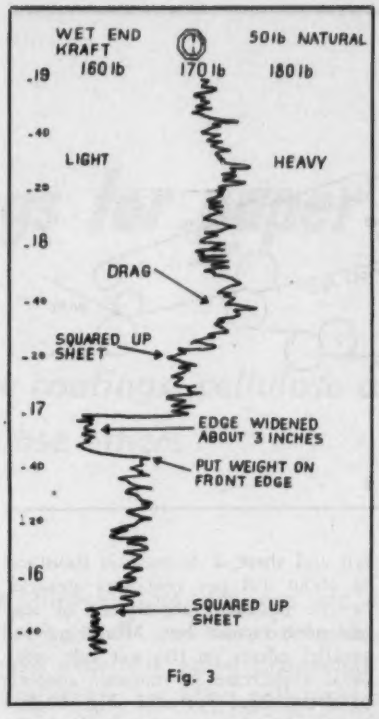


Fig. 3

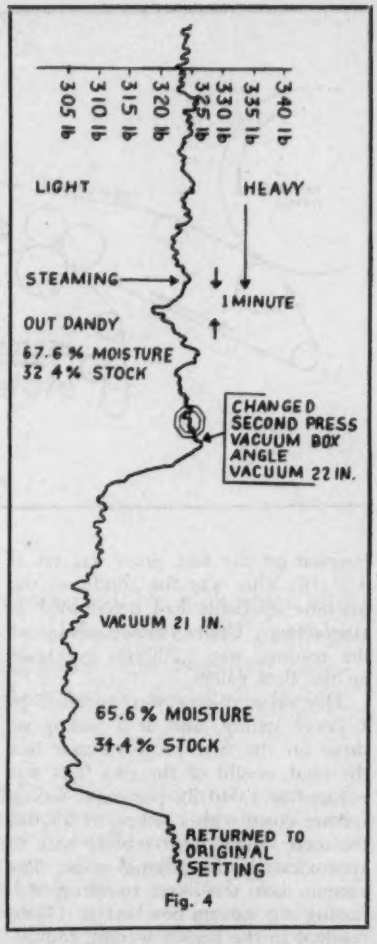


Fig. 4

gauge. The results on the roll indicated a vast improvement in the edge formation.

Permits optimum setting of presses, vacuum and vacuum boxes

One of the advantages of wet end measuring is to assist in making adjustments of the presses, vacuum, vacuum box angles, to assure the sheet entering the dryer the driest possible condition. Present methods of adjusting these variable by the vacuum pressure, sound, or other trial-and-error methods, do not assure the driest possible condition. By optimum settings of vacuum, vacuum boxes and presses, savings can be achieved in steam, or direct increases may be made in production, by assuring the driest possible sheet entering the dryer, thereby allowing a higher machine speed.

Fig. 4 was obtained on an actual paper machine. Measurement was taken between the second press and the dryer. In a matter of a few minutes it was found that, by rotating the vacuum box of the second press, the total weight of the wet end was reduced from 325 lb. per ream to 305 lb. per ream. This was on 105-lb. bleached board. Therefore the reduction in water was from 220 lb. to 200 lb. per ream. Twenty pounds more water was extracted mechanically at absolutely no increase in cost in manufacturing.

A very important point to notice in Fig. 4 is that the vacuum pressure was decreased in the optimum setting position. The machine tenders had been using vacuum pressure as a guide to the optimum setting of the vacuum box angles. This proved that the vacuum pressure gauge was not indicative of the water extracted in the second press.

In this particular case, if the paper machine had been operating at the capacity of the dryer section, the manufacturer could have taken advantage of these optimum adjustments to increase machine speed. Since approximately ten per cent more moisture was extracted by the optimum setting, possible increase in machine speed of about ten per cent could be expected. If the manufacturer desired to continue running at the same speed, he could reduce his steam requirements. As a general rule, it takes between two to three pounds of steam to dry out one pound of water. The savings of steam possibly would be somewhere between 40 and 60 lbs. per 105-lb. ream. If the daily production were 210 tons on this machine, savings of between 80 and 120 tons could be realized each day. On a monthly basis, this would amount to some 30,000 tons of steam saved by a simple twist of the wrist.

Measuring felt weights

It is not always possible to measure the wet sheet alone. For example, in a Yankee tissue machine the sheet goes directly from the wire to a pickup felt through the presess where it is in contact with the wet felt and continues on the pickup felt to where it is removed directly onto the Yankee dryer. A schematic illustrating a Yankee tissue machine is shown in Fig. 5. Measurement on the wet end of these machines requires measuring the total felt plus the sheet or possibly the double felt section. Measurements were made on the double felt section after the first press. This area contained the pickup felt, the sheet and the wet felt. Measurements were made on the pickup felt plus the sheet after the second press. Measurements were also made on the wet felt after the second press.

The Beta gauge was set up to monitor weight at various sections in the felts and variations were made in the vacuum, vacuum box angles and press pressures. The effect on the total weight was observed. Fig. 6 is the recorder chart obtained on one machine while measuring the double felt area. The existing vacuum box

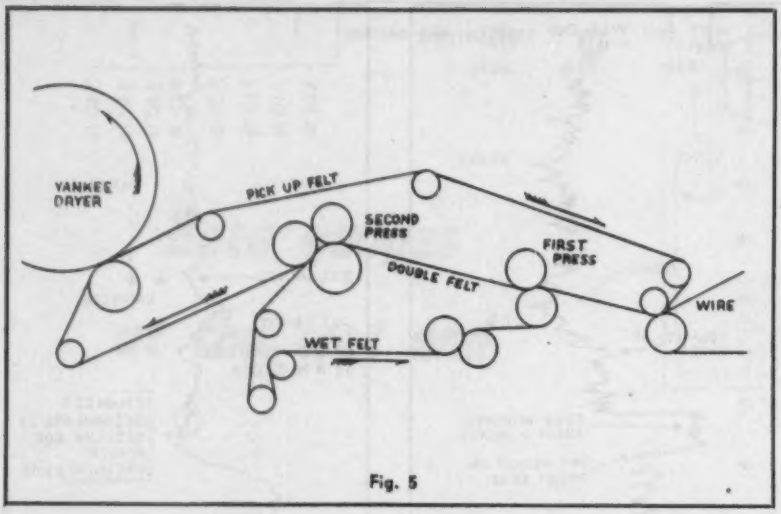


Fig. 5

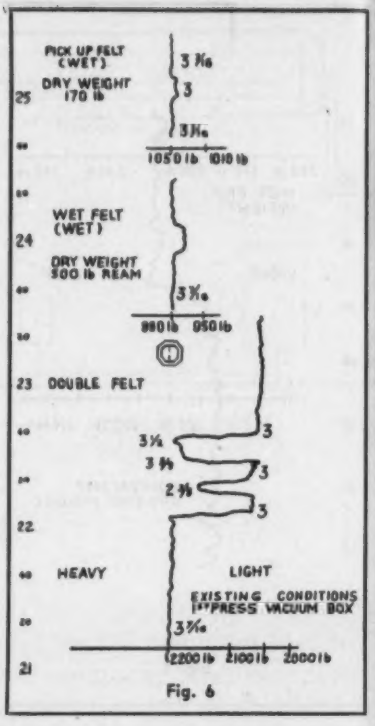


Fig. 6

position on the first press was set at 3 7/16. This was the condition the machine operators had determined as satisfactory. Under these conditions the reading was 2,200 lb. per ream on the Beta gauge.

The vacuum box was adjusted to a lower setting, and at a setting of three on the first press vacuum box the total weight of the two felts was reduced to 2,040 lb. per ream. Going further down with a setting of 2 3/8ths, the total weight went rapidly back to approximately the original point. The vacuum box was reset to three. Adjusting the vacuum box back to 3 3/8ths resulted in the higher weight, indicating a higher water content than at the optimum setting of three. This proved there was an optimum vacuum box setting for the first press section of this paper machine. At the optimum setting of three, the noise level due to the high vacuum was reduced considerably. Evidently the machine operators had been using the noise as an indication of the proper vacuum box angle setting.

The optimum reading of 2,040 lb. per ream at at the three position for the vacuum box represented a 7.2 per cent reduction in the total weight of the felts and water content. The average weight of the dry felts was measured in the gauge at 1,220 lb. per ream. Taking this average weight and neglecting the weight of the tissue, at about 10 lb. per ream, would have represented a 16.5 per cent reduction in the water content in the two felts by the adjustment effected.

The effect that these adjustments would have on the paper sheet required placing the Beta gauge after the second press. Measurements were taken on the pickup felt and also on the wet felt after the second press. Placing the Beta gauge on the pickup felt and sheet, a decrease in moisture of about 1.8 per cent was attained by the optimum adjustment of the first press vacuum box. Measuring the parallel effects on the wet felt indicated a decrease in moisture content of about three per cent. Fig. 6 also has the weight variations in the pick-up and wet felts separately, as well as the corresponding weight changes in the double felt area.

Steps toward moisture control

Across the sheet, variations can readily be determined by using a traversing system. Another application of wet end measuring which has excellent possibilities is the use of a differential system. A differential system is illustrated in Fig. 7. With this system, a Beta gauge is installed on the wet end of the paper machine and another on the dry end. These two gauges are then tied together with a differential recorder, in order that the machine operator can continuously ascertain the exact amount of moisture extracted in the dryer section. Although this will not tell the operator the exact amount of moisture in the dry end, it will tell the amount extracted by the dryer. Controlling this moisture extracted by the dryer will be a long step towards effective moisture control in paper manufacture.

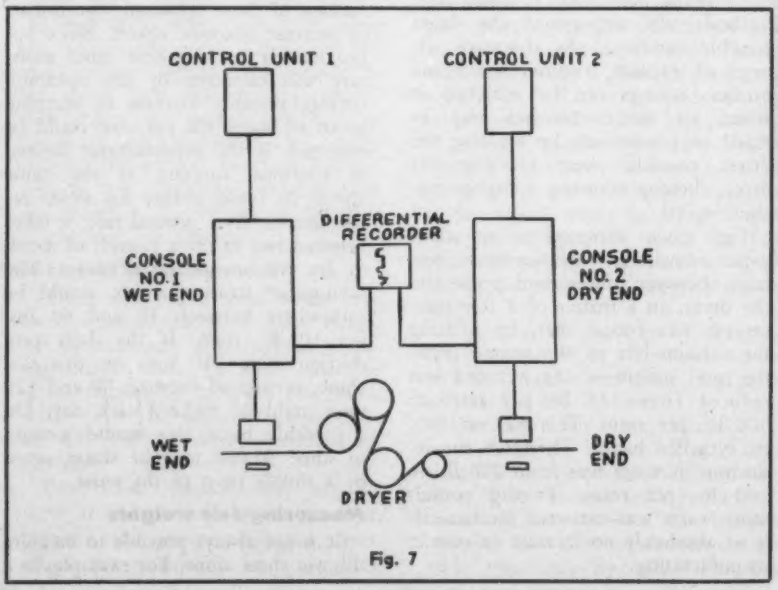


Fig. 7

Organic coatings for paper

Part VII — Nitrocellulose coatings, cellulose acetate and related esters, cellulose ethers

▶ Nitrocellulose coatings are characterized by high-gloss and block-, scuff- and abrasion-resistance; cellulose acetate coatings have excellent aging properties and good light stability; cellulose ethers, i.e. ethyl cellulose, produce tough, flexible, odorless, tasteless and non-toxic films.

NITROCELLULOSE or pyroxylin was one of the earliest synthetic resins used on paper. It imparts better properties to paper than are obtainable with spirit varnishes. Nitrocellulose by itself is a tough, hard resin, which forms solutions in organic solvents at low solids contents. In order to increase the solids contents, flexibility and glossiness, extender resins and plasticizers must be added. The special advantage of a nitrocellulose coating is its very high gloss on paper. The protective properties of the nitrocellulose lacquer are far superior to those of a spirit varnish. By proper formulations, coatings may be prepared that resist water, moisture vapor penetration, greases, acids, alkalis and other chemicals. Wax is an important additive to decrease transmission of moisture vapor. Furthermore, properly formulated nitrocellulose coatings have a high degree of block resistance, which makes them of value for use on playing cards and on book covers where the bonding is done with hot melt adhesives. The scuff and abrasion resistance of nitrocellulose coatings is also very good. However, optical bleaches or fluorescent dyes apparently cannot be used with nitrocellulose. For this reason, certain shades of white color cannot be achieved. The cost of such coatings is also a deterrent where good properties are not absolutely necessary.

Solvents for nitrocellulose

Ordinarily, expensive solvents such as ketones and esters must be used with nitrocellulose (unless SS Nitrocellulose, an alcohol soluble type, is selected), and this increases the cost of the coating application. The flammability of nitrocellulose was somewhat of a deterrent originally, but this has been minimized now largely by proper formulation and techniques.

Several types of nitrocellulose are available, but the two most common types are designated as RS and SS. The RS type is completely soluble in esters and ketones. Alcohols, such as ethyl and butyl alcohol, when used with esters and ketones will provide solutions of lower viscosities than the primary solvents themselves provide. Hydrocarbons may be used with mixtures of primary and secondary solvents in order to make the formulation less expensive

The SS type of nitrocellulose is almost completely soluble in ethyl alcohol Thus, it acquires less complex solvent combinations and is used where solvent recovery systems necessitate the use of simple solvent mixtures. SS nitrocellulose is also used in heat-sealing formulations, where it performs better than the RS type.

Both types of nitrocellulose come in a wide range of viscosities, and for paper coatings the low-viscosity types are normally used. The higher viscosity types are employed where excellent fold properties or flexibilities are required.

Additives — resins and plasticizers

Since nitrocellulose itself dissolves in solvents to give only low solids solutions with high viscosities, other additives in the form of resins and plasticizers are necessary. Resins used with nitrocellulose include the natural resins already discussed, such as dammar. Maleic-modified rosin compounds (maleic ester gums) are widely used with nitrocellulose because they increase gloss and adhesion and make possible the addition of wax so that a moisture vapor proof coating will result. Moreover, such resins contribute to heat-sealing properties. Other types of rosin or rosin derivatives that may be used with nitrocellulose lacquers include hydrogenated and polymerized rosins, as well as Vinsol resin. The methyl ester of hydrogenated rosin and straight ester gums are also used, as are the ethylene and diethylene glycol esters of rosin, hydrogenated rosin, polymerized rosin and Vinsol.

Non-oxidizing alkyd resins are also used with nitrocellulose lacquers, although they are more expensive than the rosin derivatives. Since cost is an important factor in the formulation of nitrocellulose lacquers for paper coatings, one ordinarily tries to use as much of the lower cost rosin derivatives as possible. Where large quantities of rosin derivatives are present, gloss is high, but the coatings tend to be brittle and to have poor color retention. Nitrocellulose modified by semi-drying or non-drying alkyd resins are much more color-stable and remain flexible for long periods of time. They

also have better chemical resistance.

Plasticizers are important ingredients in paper coatings based on nitrocellulose. As a matter of fact, some paper lacquers are currently produced that contain only nitrocellulose and plasticizer and that have no modifying resins at all. Plasticizers improve nitrocellulose films by making them flexible and imparting toughness. Frequently they improve gloss and give heat-sealing properties. If properly chosen, the plasticizer may also improve water, oil and chemical resistance.

Among the oldest plasticizers used for nitrocellulose are camphor and castor oil. These, however, are not widely used in paper because of their objectionable odor. The most common plasticizers for paper coatings are dioctyl phthalate and tricresyl phosphate. Many others, however, are available that may be less volatile or that may have better low-temperature properties. Butyl sebacate falls into this latter category. If the coating is to have heat-seal properties, the ratio of plasticizer to nitrocellulose is extremely important. The plasticizer, of course, should not volatilize when the film is heated, for which reason solid plasticizers are frequently used.

Nitrocellulose coating formulations

Some nitrocellulose coatings contain a small percentage of wax in order to impart moisture vapor resistance. This is extremely important when the nitrocellulose is to be coated on cellophane, which is one of the largest uses for nitrocellulose coatings. A properly formulated moisture vapor resistant nitrocellulose coating will have a water transmission rate as low as 3.0 grams per square meter for 24 hours when tested at a temperature of 100° F and a relative humidity of 90 per cent. Ordinarily, to achieve such properties 1-3 per cent of waxes such as paraffin or beeswax are used. Other waxes including carnauba wax, hydrogenated castor oil and high molecular weight fatty amides may be used not only to improve moisture vapor resistance, but also to improve "slip" and to make the coating more block resistant.

Because of the strong solvents required for nitrocellulose coatings, care must be taken to use the proper type of roller for application. Gelatin rollers, of course, require that high percentages of polar solvents be avoided, whereas rubber rollers tend to swell in hydrocarbons but are not affected by alcohols and low-boiling esters.

Nitrocellulose paper lacquers may also be pigmented or formulated with dyes to provide colored coatings. Pigmentation generally follows the same scheme used for lacquers for wood or metal.

A typical nitrocellulose paper lacquer based on the film former, an extending resin and a plasticizer might contain 21 parts RS-Nitrocellulose ½ sec., a maleic modified rosin ester, and seven parts of dioctyl phthalate. These solids can be dissolved in 65 parts of a solvent combination comprising toluene, butyl acetate, ethyl acetate, ethyl alcohol and butyl alcohol.

A typical formulation for coating cellophane to obtain a moisture-proof, heat-sealing film would include 40 parts of RS-Nitrocellulose ½ sec., two parts of paraffin, 10 parts of an alkyd resin extender and 30 parts of dioctyl phthalate, all dissolved at low solids concentration in a mixture of ethyl acetate and toluene.

As already indicated, one of the main uses for nitrocellulose is as a coating for cellophane, to which it imparts moisture vapor resistance and heat sealing properties. Nitrocellulose lacquers are also used for the coating of playing cards, labels, menus, in packaging applications where heat-sealing and a high degree of moisture proofness is desired, for maps, catalogue covers, postcards, outdoor posters, outdoor displays and box wraps.

Nitrocellulose lacquers for paper coating may be emulsified with water. This reduces the amount of volatile solvent required and provides a composition that will penetrate the paper to a much lesser degree than the solvent solutions. Such emulsions, however, are not widely used for paper coating.

Cellulose acetate and related esters

Cellulose acetate is produced by the direct acetylation of cellulose with acetic anhydride. Unsupported cellulose acetate films are laminated to paper to obtain highly decorative structures. This, however, is a very expensive operation and is definitely limited to specialty items.

Cellulose acetate is more expensive than nitrocellulose, which limits its use as a paper coating considerably. In addition, it is soluble in relatively few commercial solvents and produces solutions with low solids concentrations and high viscosities. Furthermore, cellulose acetate is not compatible with many other resins, making it difficult to formulate in order to build in specific properties.

Nevertheless, cellulose acetate has found a definite place as a coating for certain specialty products because it has excellent grease and oil resistance, aging properties and good light stability. In addition, its flammability is very low, and its films are very tough. Because of its low degree of solubility, it is resistant to oils, gasoline, alcohol and weak acids. It is also resistant to heat.

As indicated, cellulose acetate is less compatible with other resins and plasticizers than is nitrocellulose. Ordinarily, a mixture of plasticizers must be used, such as the methyl and ethyl phthalates. These, however, have a high degree of volatility. Tricresyl phosphate and ethyl glycolate are compatible with cellulose acetate. Triacetin and acetyl triethyl citrate are also plasticizers that can be used with cellulose acetate. As extender resins, some phenolics, alkyds and coumarones are useful. Natural resins such as sandarac are also compatible with cellulose acetate.

Cellulose acetate formulations

A typical paper coating based on cellulose acetate may have the following composition:

Cellulose acetate	13.3 parts
Santicizer M-17	6.7 parts
Santicizer 8	1.6 parts
Acetone	20.0 parts
Methyl ethyl ketone	8.3 parts
Nitropropane	40.6 parts
Ethyl alcohol	9.5 parts

A mixture of equal parts of cellulose acetate and a sulfonamide-aldehyde resin has been recommended as a coating to improve the electrical resistance of cellophane films. A wall paper lacquer based on celulose acetate includes 60 parts of cellulose acetate and 40 parts of santicizer M-17 dissolved in a mixture of ethyl acetate, ethyl alcohol and water at a solids concentration of about 10 per cent.

Cellulose acetate finds its widest applications where advantage can be taken of its light and heat stability and of its excellent resistance to oil and grease, as well as animal and vegetable fats and solvents such as turpentine. It is also of interest as a wall paper coating because of its good light stability. Hot melt coatings based on cellulose acetate may also be formulated.

Mixed esters of cellulose, such as cellulose acetate-propionate and cellulose acetate-butyrate, have properties similar to cellulose acetate and present the added advantage of demonstrating a wider range of solubility and compatibility.

Certain grades of cellulose acetate-butyrate are compatible with chlorinated diphenyls, rosins, maleic mod-

ified rosin esters and certain natural resins such as dammar. Plasticizers that are useful include dibutyl sebacate, dioctyl sebacate, dioctyl phthalate, butoxy ethyl stearate and normal butyl stearate. Hydrogenated castor oil and chlorinated paraffins are also compatible. Thus it may be seen that the compatibility range of cellulose acetate has been markedly improved by incorporating butyrate groups.

Recent experience has shown Half-Second Butyrate, a low viscosity cellulose acetate butyrate, to have properties of special value in paper coating formulations. The most recent development is a catalyzed paper coating with an unusual combination of good properties:

Solution A	
Half-Second Butyrate	15
Uformite F-240 (60% N.V.)	25
Dow 276-V9	10
Dow Corning 510 fluid (100 cs.)	0.05
Toluene	13.75
TECSOL®, anhydrous	20
Isobutyl acetate	15.6
Solution B*	
Alkane sulfonic acid, mixed	0.3
n-Butyl alcohol	0.3
	100.00
Nonvolatile, %	40
Viscosity, cps.	600-700
Application	Roll coat

*Should be mixed separately and added to Solution A just prior to application.

When dried at 285° F for 15 seconds, this lacquer exhibits excellent adhesion to most inked papers and does not block under 2 psi at 350° F for 60 minutes. The films have excellent scuff and mar resistance and good resistance to many solvents, even methylene chloride. The solution is water white, and the film imparts no color to bleached white paper stock. After exposure to 100 hours of ultraviolet light in the Fade-Ometer, there was no change in color of the film. Samples have shown very good resistance to soap and strong alkali solutions.

The addition of 5 to 10 per cent dimethyl phthalate increases the flexibility of this formula considerably without appreciably reducing scuff resistance. This plasticizer also increases the gloss.

In another instance the replacement of Dow 276-V9 by Paraplex G-50 has resulted in a more flexible coating that has found application on carton board such as soap boxes. Paraffin wax, at 0.5 per cent on the total, reduced the moisture vapor transmission by about 50 per cent without affecting the clarity of the film.

Some resins have been added to this formula to give better build and therefore higher gloss. Dewaxed damar and Arochem 650, used in the amount of 25 per cent on the solids did this, but tended to reduce solution stability slightly.

The formulation should be thinned for roll coat application. For application on the Chambers or Christensen machines, it was found best to thin to 30 per cent non-volatiles with:

Toluene	30
TECSOL® Anhydrous	25
Isobutyl acetate	30
Butyl Cellosolve	15
	100

A general purpose clear lacquer that has been recommended for paper based on half-second cellulose acetate-butyrate contains the following ingredients:

Cellulose acetate-butyrate	20.0 parts
Dow 276-V9	10.0 parts
Vinylite (vinyl acetate) AYAC	2.5 parts
Textrex 7-75T (dry basis)	7.5 parts
Tricresyl phosphate	2.0 parts
Toluene	43.0 parts
Ethyl alcohol	12.0 parts
1-Nitropropane	3.0 parts

This provides a lacquer with a solids content of 42 per cent and a viscosity of 1200-1500 centipoises. This coating did not block under a pressure of 2 psi at 120° F for 24 hours when tested face to back. Cellulose acetate-butyrate coatings show promise for use in electrical insulation papers and for coating of immitation leather and window shades.

Hot melt formulations based on cellulose acetate-butyrate present some difficulty because of the high temperature of the melt. Phenyl salicylate is an effective plasticizer and stabilizer for hot melt compositions. During hot melt coating the paper must be in contact with the molten material for only a very short period of time in order to prevent dehydration of the paper with concurrent weakening. This means that the paper must be run at high speed and must be cooled quickly by chilled rolls as soon as the coating is applied. Since the coating has an objectionable odor, it cannot be used in food packaging.

Cellulose ethers

The most widely used cellulose ether for paper coating is ethyl cellulose. This is prepared by reacting cellulose with sodium hydroxide and ethyl chloride. Various viscosity grades are available. Ethyl cellulose produces films that are tough, flexible, odorless, tasteless and non-toxic. The color is also good. Ethyl cellulose may be applied to paper in the form of a solvent solution, a water dispersion or a hot melt. Such films are characterized by good flexibility even at low temperatures, by good heat-sealing properties and (if properly formulated) by color stability.

Ethyl cellulose also has excellent heat resistance. Because it is widely compatible with plasticizers, waxes and other resins, it can undergo extensive formulation to provide compositions of widely varying properties. Another advantage of ethyl cellulose is its solubility in cheap solvents, such as mixtures of alcohol and toluene. On the other hand, ethyl cellulose coatings are not particularly glossy. However, superior gloss can be developed by "re-melting" the coating subsequent to application. This is particularly true for coatings applied with solvents. The "re-melt" operations involve a 3-5 second exposure to temperatures of 350° F. Since many paper converters cannot reach this high temperature, the use of ethyl cellulose for high-gloss coatings is somewhat limited.

As already indicated, ethyl cellulose is soluble in alchohol-hydrocarbon mixtures. The optimum quantity of alcohol is in the range of 20-30 per cent. Ethyl cellulose is also compatible with most common plasticizers, including phthalates, phosphates, stearates, amides and many vegetable oils. Phthalyl glycolates are also popular plasticizers.

Ethyl cellulose is compatible with phenolic resins, rosin and rosin derivatives, most natural resins and some alkyds. The addition of resins to ethyl celulose is important in order to impart gloss, hardness and adhesion and improve water resistance to films. Ethyl cellulose is compatible with nitrocellulose in all proportions and is frequently used with nitrocellulose to the extent of 10-15 per cent in order to impart flexibility and alkali resistance.

Numerous waxes including hydrogenated castor oil, beeswax and Montan wax may be added to ethyl cellulose. It is not soluble in paraffin unless a mutual solvent such as rosin or a plasticizer is present.

Ethyl cellulose coatings, especially when applied as a hot melt, should be formulated with anti-oxidants, since the material is sensitive to oxidation. These coatings are also sensitive to sunlight and ultraviolet light. Consequently, ultraviolet absorbers

(Continued on page 682)

New results and ideas in lignin chemistry

— as disclosed at the 130th meeting of the American Chemical Society

THE CHEMISTRY OF LIGNIN, a substance that "cements" the cellulose fibers in wood together and on the average constitutes 28 per cent of the softwood and 22 per cent of the hardwood, came under special scrutiny during a symposium held by the Division of Cellulose Chemistry at the 130th meeting of the American Chemical Society.

The chemistry of lignin is far from solved. A full understanding of lignin has so far evaded the investigation of some of the world's most brilliant chemists. The difficulty in solving the lignin problem lies in the fact that the building stones of lignin are bonded together in such a way that they cannot be separated from one another without bringing about more or less drastic structural changes.

Mechanism of lignification. New light was thrown on the mechanism of lignification by W. J. Schubert and F. F. Nord of Fordham University. They prepared a shikimic acid, with carbon-14 introduced in the 2 and 6 positions of the cyclohexene ring. This labeled shikimic acid was incorporated into a living sugar cane plant. The lignin of this plant was then isolated and, after its activity was measured, oxidized to vanillin. The results showed that the cyclohexene ring of shikimic acid was converted directly into the aromatic ring systems of lignin without randomization of the carbon atoms.

Extraction of lignin from finely ground wood. Anders Björkman of Sweden reported that he has succeeded in extracting 30-50 per cent of the lignin in Norwegian spruce by grinding a small quantity of the wood in a non-swelling liquid in a vibrational board mill. The non-swelling liquid used was aqueous dioxane. The milled wood lignin has a molecular weight of about 11,000 and differs in several respects from Braun's native lignin. The milled wood lignin dissolves rapidly on sulfonation in a sulfide cook, even under neutral conditions.

Alkaline hydrogenation pulping. Conrad Schuerch and co-workers, of the New York College of Forestry, Syracuse, reported that catalytic hydrogenation of wood under alkaline pulping conditions, and with a hydrogen pressure of 400-600 psi, converts the lignin into a viscous phenolic oil, ¼ of which is a mixture of distillable phenols and ¾ of which is a thermoplastic phenolic resin that melts to a clear brown liquid over the temperature range 90-150°C. The process, considered economically feasible, yields a pulp that is identical in every way with a conventionally processed alkaline pulp.

Investigations on Braun's native lignin. G. A. Erdtman of the Central Laboratory of the Swedish Cellulose Industry, described a method based on determination of the changes of the ultraviolet absorption produced by ionization or other reactions affecting the chromophores of native lignins from *Picea mariana* and *Picea abies*. The reactions included ionizations and sulfonations of both samples and the methylation and catalytic hydrogenations of *Picea mariana*. The results indicated the presence of 0.5-1 per cent of phenolic coniferyl aldehyde elements, somewhat more of etherified units of the same type, roughly 3 per cent of elements related to acetoguaiacone, and a high content of phenolic diphenyl units (up to about 20-30 per cent).

New pharmaceuticals from vanillin. The synthesis of a number of pharmacologically active products derived from vanillin, the most important degradation product of lignin, was reported by Karl Kratzl of the University of Vienna.

One of these products is vanillic acid diethylamide, which was shown to be 15 times as active as "Nicethamide" in its effect on respiration and blood pressure. Vanillic acid diethylamide has been used successfully in several European countries in cases of acute circulation failure, barbiturate poisoning, and in interruption of narcosis. Its effects were especially dramatic in general circulation failure of premature births.

Also starting from vanillin, the guaiacyl group has been introduced into the isoquinoline skeleton. In this way, two alkaloids, coclaurine and codamine, as well as several other derivatives of 1-benzyl-isoquinoline and 1-phenyl-isoquinoline could be synthesized.

Oxidation of spruce periodate lignosulfonic acids with chlorine dioxide. D. Morrison Smith and C. B. Purves, McGill University, reported that a solution of spruce periodate lignosulfonic acids, when thoroughly oxidized for two weeks with excess chlorine dioxide, yielded about 60 per cent by weight of the original lignin as oxylignosulfonic acids, which were isolated in the form of their calcium, barium, or zinc salts. Up to 60 per cent of the original sulfonic acid groups were recovered as barium sulfate from the liquor. The oxylignosulfonic acids contained carboxyl groups and chlorine, most of which was removable by alkali.

(Continued on page 682)

Biochemistry of lignin discussed at third lignin round table conference

J. R. PECKHAM
The Institute of Paper Chemistry

THE MEETING OF LIGNIN CHEMISTS at Appleton, Wisconsin, on September 25 through 27, was sponsored jointly by the Fundamental Research Committee of TAPPI and the Committee on Chemistry of Plant Products, Division of Chemistry and Chemical Technology, of the National Research Council. Dr. Harry F. Lewis, who is Chairman of the former group, was general chairman and Dr. Roland Kremers, member of the Research Council Committee, was program chairman.

The theme of the lignin meeting, set by Dr. Kremers, was the role of the biochemists in delineating some of the chemical enigma surrounding this complex substance. Some of the tools at their command were studies of the sap flow of deciduous woods, cambial chemistry, the judicious use of optical and electron microscopes, synthesis and testing of lignin precursors, and enzymatic and microbiological studies on the mechanism of lignin formation.

New results in lignin studies

Dr. J. W. Marvin and his coworkers at the University of Vermont had a large backlog of data covering the factors affecting sap flow in maple trees. Their data had the value of containing the long time history of not only single trees but of large groups of trees (or sugar bushes). Observations on the sap flow, its composition and the tree's water balance show that the dormant stem is capable of striking changes, presumably of a metabolic nature. Dr. Marvin suggested that some of the puzzling problems of translocation might be understood by further study of the closed systems rather than study of the open (leafy) system which have been used for so long.

Dr. R. S. Bandursky of Michigan State University coupled respiration and growth in the life of a tree. Growth, he said, cannot take place without the expenditure of energy and he considered the mechanism of trapping the energy released by the respiratory processes and the efficiency of the trapping action. In his dissertation on the growth process, Dr. Bandursky reviewed several of the possible mechanisms by which the growth hormone could affect water uptake in a plant.

Dr. M. W. Bannon of the University of Toronto focused the assembly's attention on the cambium layer when he pointed out that nearly all of the wood and bast of conifers originates in this zone. The cambium, he said, only a few cells wide during the dormant period, becomes reactive in the spring and the zone becomes wider with cells dividing radially as well as longitudinally. The mode of division varies with the tree species as new cambial cells as well as bast or phloem cells are formed. The high degree of variability, both in different parts of the same tree and also from tree to tree, indicates that many factors determine the cell length.

Dr. A. B. Wardrop of Melbourne, Australia, illustrated his discussion with some extremely fine electron micrographs of fibers as he followed the lignification process of wood fibers. Newly formed cells, he pointed out, are extremely thin walled and their lignification must be regarded as intimately related to changes in form and dimension of the developing cell as well as to chemical changes. These changes were microscopically observed. The possibility that lignin penetrates the micellular regions was only recently brought to light and the micrographs were used in support of the theory. This lignin, when isolated, has quite a different appearance from that which was removed from the intercellular layers. This intercellular space is occupied, in mature plants, by a material which is only 4 per cent cellulose. The difference in the amount and formation of the lignin in different parts of the cellular structure indicated to Dr. Wardrop that the formation is too complex for us to envisage it as coming from a single source.

A paper by C. M. Stewart of Australia was read by his associate at the Division of Forest Products, Dr. Wardrop. This was a definitive dissertation on the present status of cambial chemistry. In his study of the cambium he also included adjacent derivative tissues which are intimately concerned with the growth of the cambium because of their importance in the transportation of water and nutrients. The theme of the paper was concentrated on the chemistry of the materials in the cell walls. The work on the chemistry involved in the transformation of nutrients into permanent constituents, such as lignin and cellulose, or temporary reserves such as starch, was traced.

Modern techniques, e. g., ion exchange, absorption and partition chromatography and electrophoresis, should prove to be of value in explaining the composition and transportation of nutrients which supply the tissues. Other avenues open for obtaining more knowledge of the cambium include radio isotopes, electron microscopy and quantitative ultraviolet and infrared spectroscopy.

Dr. Folke Skoog, University of Wisconsin, described how tissue cultures could be used as a tool in the search for chemical substances controlling growth and differentiation in plants. Dr. Skoog, who used the tobacco plant in his experiments, was joined by Prof. Hans Geissbuhler, also from the University of Wisconsin, in describing the use of tissue cultures in the study of jackpine, Norway pine and white pine.

Dr. Kremers, cambial chemist at The Institute of Paper Chemistry,

spoke on results obtained in a study designed to isolate and identify soluble sugars present in inner bark and outer sapwood of trees. The study, made on the common aspen, was directed to perfecting a routine method of analysis suitable for surveys of tree populations.

Dr. Karl Kratzl, University of Vienna, showed how lignin formation could be better understood by a study of biogenetic offshoots as well as by the lignin itself. The chemistry of polymeric carbohydrates and especially investigations in the field of proteins are examples showing how knowledge of biological growth and decay can contribute new clues to the constitution of natural products. Another research tool used by Dr. Kratzl and his colleagues was carbon 14, a radioactive isotope. This so-called "tagged" substance is introduced into the growing tree and the use made of it is studied by microanalytical and radiochemical techniques.

The mechanism of lignification was discussed by Dr. F. F. Nord of Fordham University. Although the subject of the origin of lignin is far from closed, there is good evidence that its ultimate parent is carbohydrate material. Nord's techniques used radioactive carbon which he incorporated in shikimic acid which was in turn placed in sugar cane. The active material was found to be intimately bound by the plant into non-water extractable components of the stem.

Dr. Erich Adler's "Newer Views of Lignin Formation" also involved the use of radioactive carbon introduced into shikimic acid. Dr. Adler, Chalmers University of Technology, Sweden, traced the steps by which the substance can be incorporated into lignin. He reviewed current work with pea roots and demonstrated how Eugenol, a substance in plant roots, could be converted into lignin by the use of hydrogen peroxide.

Dr. Holger Erdtman, The Royal Institute of Technology, Sweden, presented a summary of science's attacks on the lignin problem. His critique and summary were thoroughly enjoyable. His long career in this field eminently suited him for the task of tracing the evolution of our present level of knowledge of lignin chemistry. His closing remarks gave tribute to Dr. Lewis, vice president of the Institute and winner of the coveted Mitscherlich medal, who has been a guiding force in the move to bring scientists of all nations together for a mutual exchange of ideas.

New Results & Ideas

(Continued from page 680)

Structure of phenylpropane units in lignin. The results obtained by E. Adler and co-workers at the Chalmers Technical University, Sweden, indicate that at least one-fourth to one-third of the phenylpropane units in the lignin belong to the guaiacylglycerol-β-aryl ether structure. These results were based on experiments involving the action of mineral acids on lignin and model substances of the guaiacyl glycerol-β-aryl ether type.

Lignin isolated by enzymes. Grinding spruce and aspen wood on a vibratory ball mill for 5 hours, J. C. Pew of the U. S. Forest Products Laboratory in Madison, Wis., found that cellulases readily digest about 95 per cent of the carbohydrates from the powdered wood and leave a lignin residue with a carbohydrate content of 12-14 per cent. This residue, on hydrolysis with strong acids, gives all five sugars present in the original wood. The residual carbohydrate appears to be firmly attached to the lignin, and is polymeric in nature. No method has been found to remove the residual carbohydrate without simultaneously removing a part of the lignin.

The impure spruce lignin is completely soluble in aqueous sodium hydroxide, methyl Cellosolve, pyridine, benzyl alcohol, dimethyl sulfoxide, formic acid, formamide and phenol.

Color in the Paper Industry

(Continued from page 673)

strips indicated light switches. Background areas were painted a vivid red.

While hand rails and stairs were painted black, the ends received coats of focal yellow. Step edges, guards and other spots, likely to be "caution" areas, received coats of bright yellow paint. As an extra safety precaution, the mill fabricated in its own shop a number of metal guards to place around the end of drive shafts. They were painted bright yellow. "Caution-consciousness is evident throughout the mill", Mr. Primm says, "a lot of skinned shins and bumps have been prevented due to the generous use of paint, and employee efficiency has been raised."

This is one example how individual management can use paints and colors in its own right and to its own taste. It is preferable to follow the advice of Color Codes since they have been worked out by reliable color experts. The main thing, however, is to call attention to dangerous spots through use of colors. It is only of secondary importance which color scheme you will follow.

Organic Coatings

(Continued from page 679)

are included in coating compositions where excellent light stability is expected.

Ethyl cellulose formulations

A typical ethyl cellulose lacquer for paper, which must be "re-melted", includes the following ingredients:

Ethyl cellulose N-10	60 parts
Dow resin 276 V-9	18 parts
Dicyclohexyl phthalate	10 parts
Cellolyn 102	10 parts
Carnauba wax	2 parts
Xylene	140 parts
Toluene	100 parts
Isopropyl alcohol	60 parts

This provides a lacquer of 25 per cent solids.

A typical hot melt formulation based on ethyl cellulose may have the following ingredients:

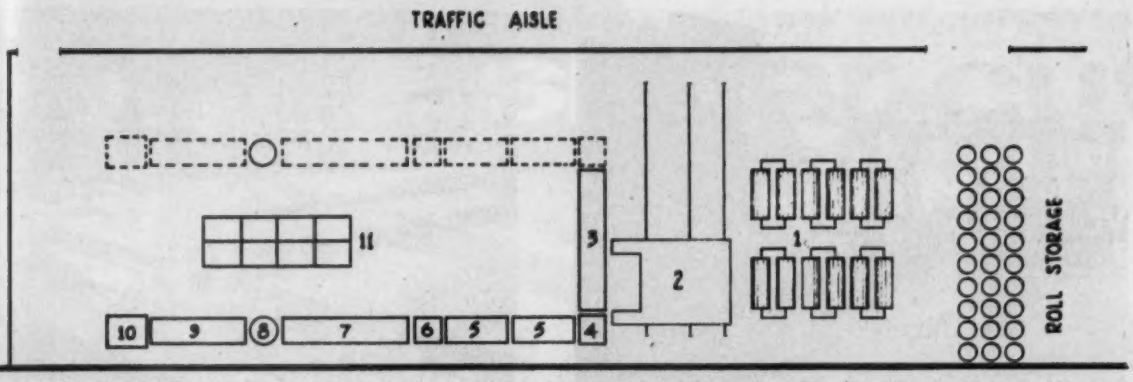
Ethyl cellulose	17 parts
Tricresyl phosphate	10 parts
Glycerol ester of hydrogenated rosin	15 parts
Paraffin wax	5 parts

The following formualtion is an alternative hot melt composition:

Ethyl cellulose	65 parts
Alkyd resin plasticizer	15 parts
Dibutyl phthalate	15 parts
Paraffin wax	8 parts

Such compositions are used as heat-seal coatings for labels and for packaging, especially where seals must be made to cellophane, waxed paper and aluminum foil. Ethyl cellulose coatings are also useful for soap wrappers because of their excellent alkali resistance. They are also of interest as coatings where light fastness, washability and durability are required.

Another cellulose ether that has been evaluated is benzyl cellulose. This is made by the interaction of cellulose, benzyl chloride and sodium hydroxide. So far this compound has not been widely used, although it is characterized by low moisture absorption, good chemical resistance and a low softening range. It is so similar to ethyl cellulose in performance that its higher cost has permitted only a limited application in the paper industry.



Floor Plan: (1) Twin backstands; (2) Jagenberg sheet cutter; (3) layboy conveyor; (4) transfer table; (5) delivery conveyors; (6) No. 1 lift table; (7) wrapping table and carton tipper; (8) carton sealer; (9) tipper and storage conveyor; (10) No. 2 lift table, and (11) wrapper and carton storage

Modifications by Powell River improve Jagenberg cutter

R. W. CHAPELL

Present annual sheet news production at Powell River is 7000 tons, amounting to only 35-50 per cent of the new cutter's capacity. A second parallel production line planned for the future will enable the cutter to operate at full capacity

WITH AN IMPROVED sheet-handling system of Powell River design, the recently installed $40,000 Jagenberg sheet cutter is increasing the efficiency of sheet news production at Powell River Co. Ltd. and is eliminating a greater part of the operator fatigue previously encountered.

Among the several modifications made on the German-made cutter and its auxiliary equipment by technical personnel at the Powell River, B. C., mill are:

1. The cutter's traversing platform, which was designed by company engineers from the manufacturer's general drawing. The drive for the traversing platform was of Powell River design.

2. All designed at Powell River was the single overhead hoist that travels on a U-shaped trolley beam to load the two sets of backstands. Core shafts for these backstands were patterned after those used on Powell River's two old cutters, with modifications to suit the Jagenberg cutter.

3. To permit a greater range of roll widths, Powell River introduced new trim deflectors and at the same time lengthened the shafts of side joggers on the layboy.

How the cutter operates

Housed in a new 50- by 200-ft. sheet news plant in No. 4 warehouse and remodeled at a cost of $67,000, Powell River's new sheet cutter is equipped to handle sets of 12 rolls up to 40 in. in diameter. It will trim to a maximum of 94 in., has a sheet length range of 15 to 83 in. and will slit to a minimum width of 12 in.

An overlapping delivery makes possible speeds of up to 500 fpm, or 60 per cent more than that of the company's present two cutters, without sacrificing sheet length accuracy. Tolerances are 0.1 per cent for sheets of over 40 in. and approximately 1/32 in. for sheets under 40 in.

Rolls are handled from local storage inside the new cutter room by clamp truck to the cutter backstands, where the core shafts are inserted prior to loading by overhead electric hoist into fully-adjustable backstand bearings.

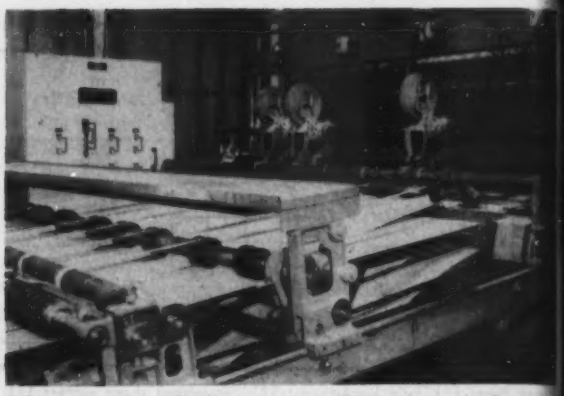
Equipped with twin, side-by-side open type backstands, the cutter and its layboy assembly are mounted on a traversing platform to line up with either backstand. This arrangement permits one backstand to be preloaded while the cutter is operating from the other, reducing down-time between sets to a minimum.

Sheet length is accurately predetermined by handwheel adjustment of the PIV gear, the size being directly observed on a graduated drum. Time-consuming trial-and-error methods are eliminated in the process. A unique feature of the cutter, which does away with a monotonous occupation, is an electronic counting device that automatically inserts tags at any desired count.

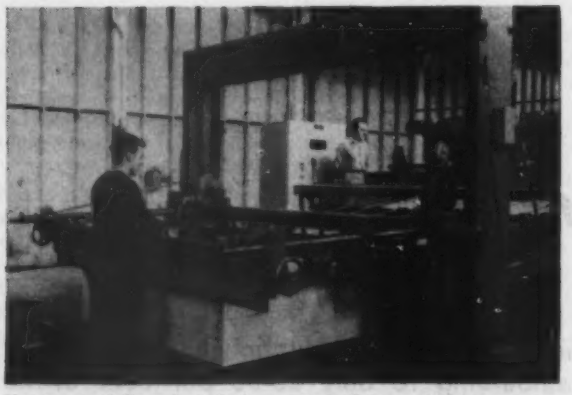
Of a mounting type, the layboy section is hydraulically operated, its speed of upward travel being set to any desired rate by conveniently placed controls.

Sheets are delivered onto pairs of plywood pallets set on a low, powered flat belt conveyor that is mounted directly beneath the layboy and runs the full width of the cutter traverse. This conveyor is reversible to enable discharge of sheet stacks in either di-

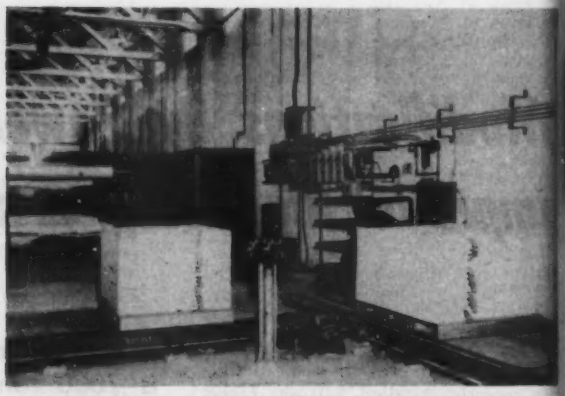
Loaded backstand and part of the cutter's cutting section



Delivery section with three ream marking units and electronic counting device



Sheets are delivered at layboy onto pallets on layboy conveyor



Layboy conveyor, transfer table and delivery conveyor

Stacks are kept at any desired level on first lift table

The second lift table facilitates loading of bundles on pallet boards

rection and provides for future expansion of conveyor lines.

Maximum sheet stacking height of 44 in. is automatically controlled, and the layboy is then raised further, as required, to enable side withdrawal of pallet loads on the belt conveyor.

Pallet loads, one or two stacks to a pallet, are driven off the belt and centered on a short roller section. Wheels between the rollers are raised clear, and the load is discharged at right angles by pneumatically-operated cylinders onto a second prestarted flat belt conveyor. The transfer (roller and wheel) section returns automatically to receive the second pallet load while the first is transported to the wrapping station or onto a short storage conveyor.

From the storage or delivery conveyors the pallet is driven onto a roller-topped, hydraulically-elevated table, which is progressively raised as desired by the operator. This enables him to keep the top of the stack of sheets at a convenient working level and reduces back strain when loading reams into the cartons.

(Continued on page 688)

3818

3750

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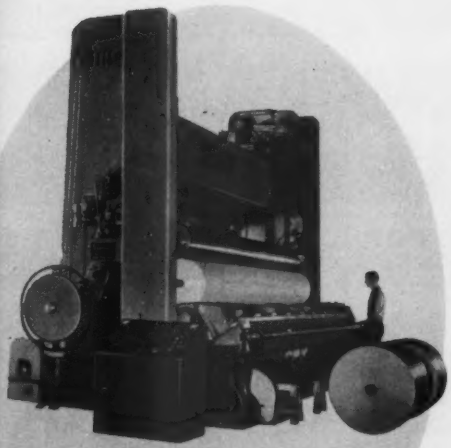

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. . . front and rear cutter units can now be added or removed easily and quickly, for fast set-up changes.

. . . an automatic safety device prevents cutter-blade nicks when engaging or disengaging front and rear units.

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THE HUBINGER COMPANY 1881 1956

Keokuk, Iowa

Colorants in paper* — Rags to Riches

LEONARD B. SCHLOSSER**

Color in paper has a functional use determined by the end-use of paper products; it is also used to create merchandising appeal as dictated by design and stylistic trends

COLORED PAPERS were known very early in history. There was an edict issued in China in 674 A.D. requiring the use of a yellow dye, a derivative of the seeds of an Eastern tree, in religious and other documents of official record for the purpose of protecting them from insect damage. Color was applied to these early papers by means of a brush or immersion of the finished sheets, for it was not until some years later, perhaps about 900 or 1000 A.D., that the addition of color to papermaking pulp was invented by the Koreans. By the end of the 17th century, pigments such as ochers, umber and vermilion were in use in European papermaking. There is a legend that in England in 1790, the first blue paper was made because a vatman's wife dropped a bag of blueing into a vat. Colored papers were also produced from colored textiles, particularly those that had been dyed with fast vegetable dyes.

After the discovery of mauve by Perkin in 1856, synthetic organic dyestuffs found rapid and ready application in the paper industry, and were in wide use by 1870. Prior to this time, colors in use in the industry had been pigments, vegetable colors, lakes, etc.

Functional coloring

Let us consider first the internally colored papers in which color is applied to the pulp before the pulp is formed into paper. These grades include bond, ledger, and index papers which are prepared for pen and ink writing rather than for printing. All papers in this group are hard-sized for maximum water-resistance, to prevent ink spread, and to increase erasing qualities and resistance to damage by handling. Sizing is an extremely important variable affecting both the color of the paper and its method of application. Color in these papers is genuine functional color, determined by the end-use requirement. For example, the business use of multiple part forms, index cards and punch cards requiring color as a distinguishing characteristic, has found wider and wider application as the complexities of paper work increase.

Color in these papers is applied in the beater to minimize bleed and provide maximum fastness to light, alkali, acid, and chlorine. Fastness to chlorine, of course, is required because of the constituents of ink eradicator, one of which is a chlorine producing compound. The principal limitations of the application of dyestuffs and coloring material to papers of the writing paper category are the high degree of fastness and permanence required for record-keeping use and resistance to wear in handling, plus the fact that all these papers require a high degree of water-resistance, and the consequent use of rosin and alum size. This assists the use of dyes such as the acid dyes, having little affinity for cellulose, for they are retained on the fiber by the action of the size. Acid dyes, in general, however, have poor fastness characteristics, and the use of direct dyes or pigments is more frequent for writing papers.

Pigments have their limitations, particularly since they account for a measurable part of the weight of any finished sheet of paper, as does mineral filler added in the beater. There is consequently less fiber employed, weight for weight, and in extreme cases lowered strength characteristics may result. Pigments also tend toward two-sidedness, the effect produced on the paper machine when color or mineral filler is removed from one side of the sheet by the suction applied on the paper machine wire, thus causing a difference in shade from one side to the other.

Blotting paper, a bulky unsized sheet that is without water-resistance, requires a strong kind of color for the performance of its function as an absorbing and obliterating agent. Since blotting paper is unsized, although some alum is used in it, there is little or no assistance given to dyes with little affinity for cellulose. Basic dyestuffs, therefore, with their great affinity for cellulose, or pigments giving good retention with alum alone, such as Prussian blue, for example, may be used, as may direct dyes.

Since fibers containing a large proportion of lignin are often used in the manufacture of blotting paper, the high affinity of basic dyes for such fibers is a help rather than a handicap, as it might be in a mixed furnish. A mixed furnish composed of highly lignified and less lignified fibers gives a "granite" effect with basic dyes, that is, the highly lignified fibers are likely to be a dark color in relation to the remainder of the fibers in the furnish. Occasionally a granite effect such as this is a desirable one, and may be produced either by this means or by the actual addition of darker colored fibers to the beater, these fibers having been dyed at another time.

Safety paper is an example of dip-colored paper in which coloring is applied to the finished sheet subsequent to the process of paper manufacturing. The web of paper is passed through a bath of color, then between two rolls, one with an engraved design and the other a soft rubber roll,

*Abridged from a paper presented at the Perkin Centennial, Waldorf-Astoria, September 12, 1956.

**President of Schlosser Paper Corp.

so that a design is imprinted in color on a background of a lighter shade of the same color. Notice that this pattern is in precise register from side to side, an achievement of less difficulty than it might seem because of the method employed in applying the design. The dyes used in safety paper are also functional colors, but are deliberately selected for their poor fastness to chlorine, acid, and alkali. On the other hand, they must have good fastness to light because of their use in checks and checkbooks. High solubility is important in these dyestuffs because of the concentrated method of application of color to the paper. The colors are not dissimilar to bond colors; their function as colors is quite different.

Color for merchandising appeal

Let us now discuss the application of color to paper for merchandising use or for stylistic appeal. These papers have their origin in printing paper, and ability to print physically and to act as a background for printed material is the most important purpose of the papers in this category. Cover papers, manufactured for the protection of booklets and other printed material, are an example of this type of paper. Dark colored covers were common and, in fact, widely desired only a few years ago, and their somber shades related both to the stylistic influences of the time and to their resistance to soil and marking. Changes in fashion have brought about a change in colors, however, and present day colors of cover papers are of brighter hue and are more widely varied as to both basic color and shade. Design consciousness and the stylistic trends, coming increasingly into play in the merchandising of all products, require the use of more and more colors and wider variations of those colors.

The colors of the text paper group are diversified as to hue, intensity and chroma. They may be applied in pastel shades to provide a background for printing or may take the form of especially designed methods. The task of the paper colorist in this field is a difficult one, for he must deal with mixed fiber furnishes, with and without fillers, with and without sizing, and with many different kinds of paper machine conditions. It is often necessary to cope with heavyweight papers whose use does not permit them to be two-sided and which may not bleed color on to paper machine felts or in subsequent use. It is also often required that the broke or waste paper produced in the manufacturing process be easily bleachable so that it may be reused. It is not at all uncommon to use combinations of several kinds of dyes plus pigments to fulfill the conditions and limitations imposed by the end-use of the paper. Such combinations are usually made in the beater where the dyes are applied, rather than having been precombined before addition to the fiber. Color in papers for stylistic use is deeply-rooted in the tradition of papermaking, and the first book showing the Munsell color system for the graphic arts industry was put out by a paper manufacturer in 1921.

Selling products by means of color in paper is no small business. Fortune Magazine, in the September 1956 issue, states that direct mail is the largest single advertising medium, amounting to $500 million in 1956. Part of this advertising expenditure is spent on colored paper, and all of it uses color in one form or another, whether in printing ink applied to the paper or even to tint the white of the paper, where white paper is used, to a pleasing shade.

The last year or two has even seen the special development of bond paper in a particular group of colors of origin geared to consumer psychology and made for direct mail advertising. This is a new concept and perhaps an important one.

White papers, too, are actually colored, for pigments or dyes are generally used to change the yellowish tint of bleached wood pulp to a shade of white appearing more white to the eye, or to provide a pleasing background white for printing.

Surveys of white paper shows an enormous variation in shades of white, even within a particular grade of paper made by different manufacturers. Each one of these shades of white is made to meet what each manufacturer hopes will be the purchaser's desire. These white papers are tinted in the beater, in general, by pigments in the form of blues, reds or yellows, in varying proportions, to produce the shade of white desired. Design consciousness has its place in white papers, just as it has in colored papers, for modern printed material appearing on white paper has caused a constantly increasing demand for greater opacity and greater brightness or "whiteness" of appearance. We even have "whiter than white" paper which contains "optical bleach" in the form of a fluorescent white dye.

Colored coated papers

Coloring on paper may be seen most often in colored coated papers to which color has been applied as part of a coating consisting of minerals held on to the sheet by means of starch or casein or synthetic latex adhesive. Colored coated paper may appear in many forms. It is possible to produce duplex colored coated papers with one side differing widely in color from the other, just as it is possible to produce metallic effects with colors and metallic powders applied as part of a continuous plastic coating.

The shade of white coatings is an important factor, just as is the shade of white uncoated papers, and is of particular significance where multicolor printing is to appear on the final sheet.

The use of color in paper of all kinds is on the increase, for color in paper has made it possible to dramatize the products of industry in a color-conscious and design-conscious age. As industry in general and its use of color continues to grow, the paper industry in its own use of color will continue to expand and to find new applications for color, both in its own consumer goods and in its important graphic function as a merchant of other products.

Modifications by Powell River

(Continued from page 684)

The wrapping conveyors are gravity roller type, the roller surface being used when filling carton pack. Removable sheet metal-surfaced covers are utilized for Master Pack filling (bundle-wrapped sheets).

When filled, and with lids in place, the cartons are rolled down the conveyor and rotated through 90° on a ball transfer section. They are then inverted by hand through a tipping device, and are held under pressure while they are sealed with 60-lb. kraft tape. After the sealing process, cartons are again inverted and discharged to the loading station, which consists of a skip on a second hydraulic elevating table at conveyor level. This table can be progressively lowered as desired while the cartons are discharged, obviating any manual lifting.

Finally, the skipload of marked cartons is removed by forklift truck to warehouse storage or directly onto flatcars on the adjacent trackway for transport to the wharf.

Master Pack bundles are handled in a similar manner, except that the finish wrapping is done in one operation on the plywood covers, the inverting and sealing equipment being readily converted into straight roller sections.

The Newcastle mill of Fraser Companies Ltd., winner of the Edward Benton Fritz Memorial Trophy for 1955.

Safety: a measure of man's respect for his fellow man

Fraser mill takes Fritz Trophy second straight year

CONTINUED AND INCREASED effort has borne fruit for employees of the Newcastle, N. B. mill of Fraser Companies Ltd., where a successful accident-prevention program comprises "99 parts human relations and 1 part safety engineering."

For the second consecutive year, the 175-ton kraft pulp mill is the recipient of the Edward Benton Fritz Memorial Trophy. The award is made annually during the National Safety Congress for outstanding performance by a mill member of the National Safety Council's Pulp & Paper Section. It is sponsored by THE PAPER INDUSTRY.

By continuing and at the same time increasing its accident-prevention program, the Newcastle plant has extended its injury-free record through 1955 (the year for which the Fritz award was made) and well into 1956. As of June 1 of this year, the mill's last reportable injury had taken place on December 8, 1952; and through December 31, 1955 the accident-free man-hours totaled 1,706,152.

For the contest year alone (January 1 to December 31, 1955), man-hours worked at the mill came to approximately 235,072.

The Newcastle safety story since the first full year of operation looks like this:

Year	No. of Accidents	Frequency Rate
1950	42	56.72
1951	5	6.86
1952	5	7.86
1953	0	0.00
1954	0	0.00
1955	0	0.00

Don A. Adams
Mill Electrical Superintendent and Chairman, General Safety Committee

Cooperation on the part of every member of the staff—executives and mill workers alike—has made possible: first, the startling reduction of 1950-1953, and, second, the continued perfection of 1953-1955.

Not so long ago: a wilderness

In the late 1940s the east coast of New Brunswick was for the most part untamed wilderness. When in 1949 Fraser Companies at Edmundston decided upon the construction of a kraft pulp mill on the Northwest Miramichi River, the area was ideally suited: timber, water power, transportation.

But, a major disadvantage was the lack of men with mill experience. With the exception of a handful of well-trained plant personnel imported from the big mill at Edmundston, the men who were to put into operation one of eastern Canada's major pulp plants were not equipped for the task.

And while this meant that the workers knew little of industrial safety programs, it also meant that they did not have preconceived notions of safety and could be shown the proper methods and acquire the right attitude toward the job and its hazards. From the very beginning, safety was a watchword, and the mill manager took a firm, keen and abiding interest in accident-prevention.

Production up, accidents down

Since the mill start-up, production has been increased by more than 45 per cent through two major expansion programs. At the same time, accidents decreased sharply. The reason: a thorough and smoothly operating safety program that has the sincere cooperation of *every* employee.

The program was instituted by the mill manager in 1950, and the pattern set at that time has remained relatively unchanged. An organization consisting of a safety committee and sub-committee was formed. With aid and advice from company officers, using NSC literature and exerting imagination and initiative, the committee structure began to produce results.

Posters, signs and slogans were strategically placed throughout the mill. Personal talks and appeals were made to supervisors and men. Every injury was followed up promptly and fully.

No special incentives such as prizes or cash awards were used to promote safety. *(Two exceptions: the completion of two accident-free years was marked by the presentation to each man of an inscribed hygrometer, and after three such years each employee was given a suitably engraved lighter.)*

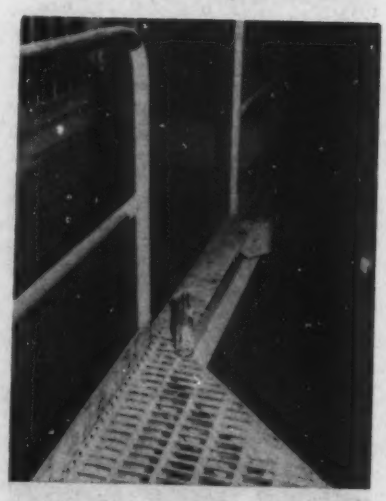
The company physician advised on the arrangements for a fully-equipped first aid room. A watchman trained in first aid is on duty at all times, and a registered nurse is in the mill an hour daily from Monday through Friday.

Support from the top

Based on the full support of the mill manager, the Newcastle safety program revolves primarily on the work of the general safety committee under the chairmanship of D. A. Adams, mill electrical superintendent. The fundamental duties of this group are:

(1) To interview and instruct all employees on safety matters; (2) to ensure that foremen acquaint new men with the hazards of the job and with ways of avoiding injury; (3) to distribute safety posters and other literature to all departments; (4) to keep the safety bulletin board up-to-date; (5) to inspect the mill daily to check on hazards and unsafe working practices; (6) to stimulate safe practices and attitudes by employees; (7) to investigate every first aid report no matter how minor the injury; (8) to investigate with the investigation committee all accidents and to ensure that necessary remedial measures are taken, and (9) to stimulate the maximum, continuing interest in safety among all personnel.

The general safety committee meets



BAD PRACTICES and housekeeping remedied at the Newcastle mill by an alert safety organization are depicted in these typical plant scenes. At the top, a hazard has been avoided through the simple installation of a railing and walkway, where before men climbed the railing and walked the narrow sump to reach valves. In the center is shown (l) a typical danger point where the worker was forced to climb guardrail and stand on slippery surface in order to reach knotter valves, and (r) the solution: the erection of a ladder and stand with guardrail. At the bottom, the space between the floor and the digester wall was a potential accident trap until (r) the floor was extended and a handrail installed. (The bottle persists as a threat to safety)

OTHER TYPICAL results of an active and forceful accident-prevention effort at Newcastle: The installation (l) of a handrail on the ladder and a railing around the platform, and (r) the use of a mill-devised guard on this planer.

once a month. The meetings are not subject to postponement, and attendance is mandatory. The gathering follows a carefully prepared agenda covering such items as a review of all first aid and accident reports for the previous month, special committee reports and a discussion of individual problems and hazards. Following a thorough study of a particular hazard or bad practice, etc., the committee determines what corrective measures should be taken and immediately makes its recommendation to management.

The committee also: determines safe operating practice and regulations for a specific job, (enforcement being the ask of the foreman); recommends protective clothing, equipment and other devices; keeps up-to-date injury, first aid room, inspection and other reports, and solicits and welcomes suggestions *from any employee.*

The Inspection Committee

During the week prior to the regular meeting of the general committee, the inspection committee tours the entire mill. Among the items checked by the group: unguarded machinery, sloppy housekeeping, defective tools, slippery floors and potential hazards. A written reort is made to the general committee.

The Investigating Committee

All personal accidents or near-accidents are studied by the investigating committee and the departmental foreman concerned. The scene of the accident is visited and witnesses interviewed. Corrective measures are determined and suggestions made to the larger committee.

The spirit and practice of safety

In submitting his mill's record for the Fritz Trophy competition, D. A. McAlary, safety director for the entire Fraser organization, had this to say:

"We are firmly convinced that safety results from the application of common sense in any job. We also believe that an effective safety program must have the support of all personnel, particularly that of the chief executives. With their active support, the spirit and practice of safety permeates the entire organization."

44th Safety Congress

(Continued from page 672)

testing and retesting can solve the problem. Each case is a problem in itself and must be handled individually.

Labor takes part

Closing the Pulp & Paper Section's general session was the annual luncheon, which was held this year jointly with the Wood Products Section.

The principal speaker was Paul L. Phillips, president of the International Brotherhood of Paper Makers, who called for increased cooperation between labor and management in the promotion of mill safety.

Giving assurance that labor will participate in all possible ways in a joint effort aimed at accident reduction, Phillips pointed out that the vast majority of pulp and paper manufacturers are extremely cooperative in working with labor in the matter. Some, he said, must still be cultivated.

Safety in industry, according to Phillips, can be furthered in four principal ways: (1) By educating the worker to be accident-conscious; (2) by resorting to government controls when necessary as a last resort; (3) by labor-management cooperation, and (4) by recognizing safety and health as costs of production.

Presiding at the luncheon was Earl F. Ripstra of Container Corp. of America, the 1956-57 vice chairman and program chairman.

In addition to the three general sessions, eight discussion and round table groups met to discuss various aspects of safety in the pulp and paper industry. The subjects included pulp manufacturing, paper converting, insulating and roofing, pulpwood logging, folding paper box and shipping container, and paper manufacturing.

Principal officers

Among the principal officers of the Pulp & Paper Section for 1955-56 in addition to those listed above are:

Regional Representatives: Arthur Carle, Northwest Paper Co. (Great Lakes); H. P. Heubner, Flintkote Co. (East); C. C. MacPike, St. Regis Paper Co. (South); Robert M. Gilmore, Rayonier Inc. (West), and Douglas B. Chant, Ontario Pulp & Paper Makers' Safety Association (Canada.)

Medical Advisor: Dr. A. P. Asselstine of Spruce Falls Power & Paper Co. Ltd.

Committee Chairmen: Gordon B. Lemke, Employers Mutuals of Wausau (Special Projects); A. Scott Dowd, Fritz Publications Inc. (Contest); Russell C. Hammond, Employers Mutuals of Wausau (Pulpwood Logging); D. V. Hill, Mead Corp. (Pulp Manufacturing); Robert J. Gell, Eastman Kodak Co. (Paper Manufacturing); V. P. Coulon, Sealright Co. Inc. (Paper Converting); Kenneth L. Faist, Champion Paper & Fibre Co. (Off-the-Job Safety).

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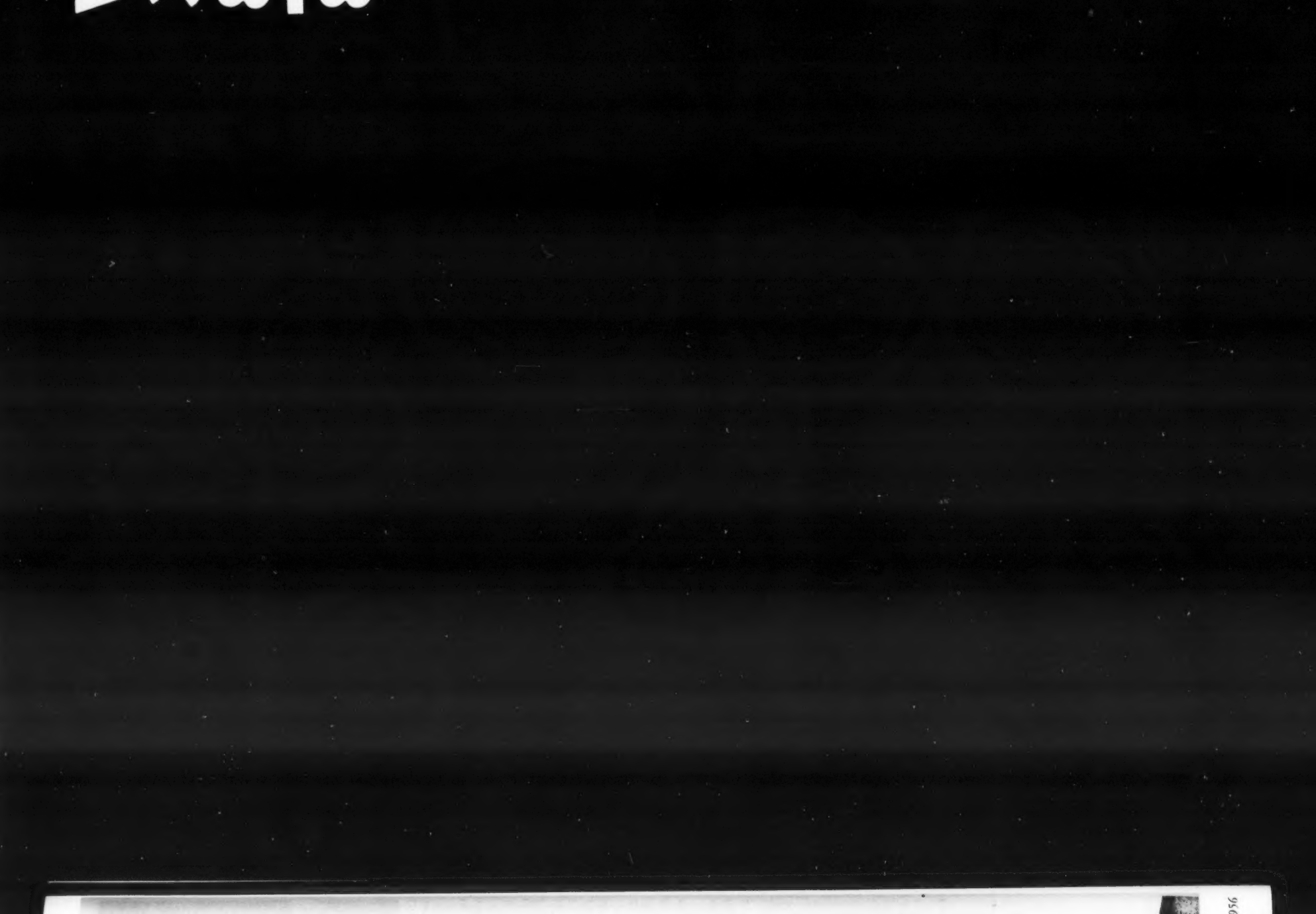

CURRENT COMMENTS

Profits: a bumper crop . . . production continues climb . . . and saturation

Unexampled prosperity for paper mill owners and employees alike is indicated in a review of the first nine months of 1956. Stockholders can expect a bumper crop of increased profits for the year—regardless of the outcome of the election.

Rising prices for fine and coarse papers have been forced on the industry, however, through wage contracts that mean more money for the mill employee. Such increased wages coupled with higher transportation costs have boosted paper's mill cost. But, production figures continue to climb, indicating no lack of demand. The industry is currently running at 100 per cent of its rated six-day capacity.

Sub-standard competition

Price increases for book papers have been followed by higher prices for kraft papers of nearly all grades. Newspaper publishers are concerned over recent rumors that the cost of newsprint will be next, although there has been no such indication from the mills.

Foreign newsprint is finding a market at about $200 per ton, even though much of it is of inferior quality. An exception is the Scandinavian product, which is maintained at the usual North American standards. However, Austrian newsprint is often so far from standard grade that it is denied duty-free entry.

Installment buying: a bonanza

Estimates of corporate dividends in all industry for 1956 place the total at upward of $11 billion—a 10 percent increase over 1955, when all previous records were surpassed. At the same time, installment buying has increased, a bonanza for manufacturers so long as high incomes allow consumers to meet the monthly payments.

Optimistic are the production estimates for the fourth quarter, although some business leaders expect that profits will not keep pace with increasing sales.

The high demand for papers of all grades is reflected in increased imports, which for paper and paper products (with the exception of newsprint) increased more than 40 per cent in dollar value during the first half of this year as compared to the first six months of 1955.

A measure of relief

The trend toward increased capacity continues. In the book paper field, where publishers have feared a shortage comparable to that in newsprint, a measure of relief is shown in the decision of West Virginia Pulp & Paper to finance a $100,000,000 expansion. Nearly half will be in book paper, with immediate plans for an increase of 400 tons per day at the Luke, Md. mill.

St. Regis Paper—like International—is moving into the Rocky Mountain area with plans for a huge mill in the Washington-Oregon region to utilize pulpwood from 300,000 acres of timberlands acquired through the acquisition of an important West Coast lumber company.

No saturation yet

These moves into the Pacific Northwest may be correlated with an apparent diminution of available new forest land in the South. So much pine acreage in the southern states has been acquired by paper companies that the available supply for new mills is bringing previously unheard-of prices. The saturation point, however, is far from reached even in the South.

Association mergers

The merger trend so increasingly evident in the paper industry during the last few years has spread to the field of associations. A presumptive union of the former Book Paper Manufacturers Association and the Ground Wood Paper Manufacturers Association will combine the activities of the two groups in the field of printing papers, both coated and uncoated. The same trend is seen in kraft paper and related facets of the industry, where there is a close affiliation between the kraft manufacturers and organizations both in the converting and by-products fields, the latter including the rapidly-growing tall oil industry. Economy is only a minor factor in the proposals, the chief purpose being the more complete and efficient compilation of production statistics.

Financial Reports

Paper mill securities in general followed the trend of Wall Street

Stock and Bond Quotations

New York Stock Exchange — Stocks

Closing Prices	Oct. 10,1956	Sept. 10, 1956
A.P.W.	43⅛	41⅛
Celotex	39¼	42⅛
Same Pref.	18¾	*18⅝-18⅞
Certain-Teed	11⅛	11
Champion P & F	34¾	38
Same Pref.	*99-100	*100-103
Cheasapeak Corp.	35	*38¼-38¾
Container Corp.	87½	88
Same Pref.	*97½-99½	*97½-99½
Crown Zellerbach	56½	59¼
Same Pref.	96½	*100½-102
Dixie Cup	*52¾-53½	59½
Eastern Corp.	29¼	*31-31¾
Federal Paper Board	31	31⅛
Fibre Paperboard	32⅞	34⅛
Same Pref.	*103½-105	*111-116
Robert Gair	34⅞	35
Same Pref.	110½	115
Great Northern	89½	94
Hammermill	34¾	35⅞
International	117¼	125½
Same Pref.	*97-98½	*99-100
Kimberly-Clark	45¼	49⅞
McAndrews & Forbes	*40-40¾	*41½-42½
Marathon	34¼	35½
Masonite	40	43
Mead Corp.	37	35
Same Pref.	*96-100	101
Same Sec. Pref.	*79-91	*78-80
Minnesota & Ontario	34¼	35¼
Oxford Paper	43½	45¼
Same Pref.	96	100¾
Rayonier Inc.	32¾	37½
Riegel	35¼	38⅛
Scott Paper	63½	67½
Same $3.40 Pref.	*92½-94½	*93½-95
Same $4.00 Pref.	*98-102	*100-101½
St. Regis	49¾	53⅜
Same Pref.	*99-100½	101
Sutherland	41	42
Union Bag-Camp	35⅜	37
United B & C	*24-24½	23⅛
United Wallpaper	*7-7⅛	8⅛
Same Pref.	*14⅛-15¼	*15½-17
U. S. Gypsum	64½	69¼
Same Pref.	*167-169	166½
West Va. P. & P.	53	54
Same Pref.	105½	105

New York Stock Exchange — Bonds

A.P.W. 5%	—	—
Champion P. & F. Co. 3¾%	100	—
Champion P. & F. Co. 3%	98	—
Mead Corp.	—	—

American Stock Exchange — Stocks

American Writing	24	25⅛
Brown Company	19½	20¼
Puget Sound	18½	19⅛

*Closing Bid and Asked Prices.

*Current Comments are contributed, and the opinions expressed do not necessarily reflect the views of the publisher.

Current Comments . . .

issues in the weeks following the Suez flare-up but strengthened somewhat as the campaign outlook changed.

Net incomes

Albemarle Paper Mfg. Co.—Net income for 12 weeks to June 24 was $634,180 as compared with $327,139 a year ago.

A.P.W. Products Co.—Net income for the quarter ended March 31 was $49,085 as compared with $45,096 a year ago.

Celotex Corp.—Net income for nine months ended July 31 was $4,565,581 as compared with $3,275,840.

Certain-Teed Products Corp.—Net income for six months ended June 30 was $3,251,459 as compared with $3,857,563 a year ago.

Champion Paper & Fibre Co.—Net income for three months ended June 30 was $3,699,855 as compared with $2,771,124 a year ago.

Crown Zellerbach Corp.—Net income for six months ended June 30 was $24,973,000 as compared with $20,642,000 a year ago.

KVP Co.—Net income for nine months ended June 30 was $2,902,404 as compared with $1,704,324 a year ago.

Kimberly-Clark Corp.—Net income for three months ended July 31 was $4,707,385 as against $4,901,188 for the corresponding period a year ago.

Marathon Corp.—Net income for nine months ended July 31 was $6,109,945 as compared with $6,672,460 a year ago.

Morris Paper Mills—Net income for six months ended June 30 was $453,819 as against $406,330 a year ago.

National Container Corp.—Net income for six months ended June 30 was $4,859,725 as compared with $3,565,818 a year ago.

Oxford Paper Co.—Net income for six months ended June 30 was $2,245,205 as compared with $1,856,207 a year ago.

Puget Sound Pulp & Timber Co.—Net income for six months ended June 30 was $1,654,452 as compared with $1,620,137 a year ago.

Union Bag & Paper Corp.—Net income for six months ended June 30 was $8,781,635 as compared with $7,155,294 a year ago. This report is for Union Bag alone, and future reports will be for the new corporation, Union Bag-Camp Corp.

United Board & Carton Corp.—Net income for the year ended May 31 was $491,470 as compared with $396,531 for the preceding fiscal year.

West Virginia Pulp & Paper Co.—Net income for nine months ended July 31 was $13,001,000 as compared with $11,138,000 for the like period a year ago.

Paper mill corporate changes

Flinkote Co. has purchased Van-Packer Corp. of Bettendorf, Iowa, the world's largest manufacturer of pre-fabricated chimneys for use in residential, institutional and industrial construction. V-P's products are an integral part of the building industry, as are Flintkote's.

W. R. Grace & Co. has purchased the assets and business of Porto Rico Container Corp. of Santurce, Puerto Rico. The plant becomes a division of Grace Internacional S. A., a subsidiary of W. R. Grace.

Owens-Illinois Glass Co. is the surviving corporation as the result of the merger of that firm with National Container Corp. Final agreement was delayed because of "technical difficulties."

St. Regis Paper Co. has acquired J. Neils Lumber Co., with plants located in the Northwest. As a result, St. Regis may build a pulp and paper mill in the Montana area. . . . St. Regis also announced that it has recently acquired all the capital stock of Cambridge Corrugated Box Co. of Cambridge, Ohio. The firm manufactures corrugated boxes used in the shipment of various industrial products.

Thor Corp. shareholders have voted to change the name of the firm to Allied Paper Corp. As the result of Thor's recent acquisition of Allied Paper Mills in Kalamazoo, Mich., the firm is now the eighth largest producer of book and specialty papers and is now "primarily active in the paper industry," according to a spokesman for the parent company.

ENGLISH ECCO CLAYS TRADE MARK CLAYS

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The Beloit Album

Paper machine previews; plans for a rebuild; and a special photo report on the unique Dard Hunter Museum at the Institute of Paper Chemistry, Appleton, as seen by the Beloit camera's roving eye

NEW BORING AND MILLING MACHINE in Beloit Iron Works' south shop attracts attention of visitors from Georgia Kraft Company, Macon, Georgia. Examining a partially machined press part are *(l to r)* Ray Johnson, Georgia Kraft engineer; Howard Rosenow, Beloit general welding foreman; Dick Gallup, Georgia Kraft plant engineer; John Redgrave, Beloit sales representative; Louis Dennis, Beloit staff engineer; Jack Frost, Georgia Kraft master mechanic; Don Horton, machine operator.

DESIGN DISCUSSION on Nekoosa-Edwards Paper Company's new 165-inch fine-paper machine. *(l to r)* B. L. Kassing, production planning manager, Nekoosa-Edwards; E. D. Beachler, vice president, Beloit; C. H. Reese, vice president, Nekoosa-Edwards; F. G. Ramsden, assistant sales manager, Beloit; D. R. Simonds, vice president, Beloit; C. C. Parvin, manager manufacturing operations, Nekoosa-Edwards; C. M. Sigvardt, Nekoosa mill manager.

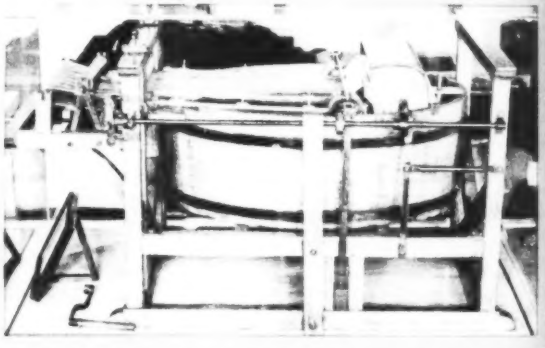
ENGINEERING CONFERENCE centers around rebuild of the Champion Paper and Fibre Company's #22 machine at Pasadena, Texas. Rebuild will include suction pickup arrangement and installation of complete differential drive. *(l to r)* R. R. Forrest, from Champion Paper's general offices, Hamilton, Ohio; G. Forrest, Beloit staff engineer; R. Kent, chief engineer, Texas Division, Champion Paper; and D. R. Schamp, Beloit sales engineer.

Dard Hunter Paper Museum

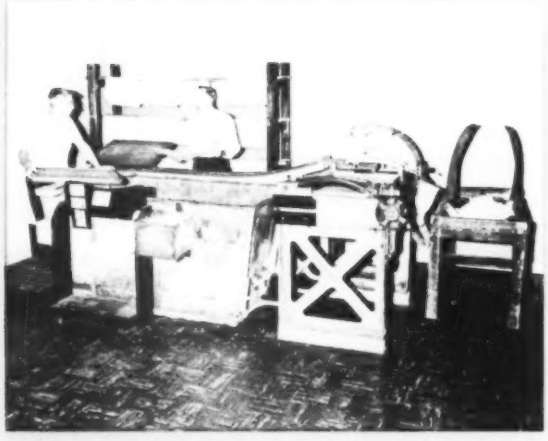
One of the most unique museums in the world can be found at the Institute of Paper Chemistry, Appleton, Wisconsin. Dard Hunter established the world-famous Paper Museum in 1939 with the hope of stimulating interest in the ancient craft of papermaking and promoting understanding of present-day paper and its relation to the graphic arts. Museum was first located at Massachusetts Institute of Technology, Cambridge. In 1954 it was acquired by the Institute of Paper Chemistry, and was moved to its present spacious, well-lighted, air-conditioned quarters at Appleton. The English light-and-shade watermark, above, is found on one of the many examples of handmade paper displayed at the Institute. See other views on this page.

MAIN ADMINISTRATION BUILDING, Institute of Paper Chemistry, Appleton, Wisconsin. The Dard Hunter Museum is housed in the basement of this modern building.

EXHIBITS in this area comprise molds for papermaking from all parts of Asia, including original type of woven mold used at the time of the invention of papermaking in China, second century A.D. Walls are hung with early Chinese wallpapers and ancient paper currency.

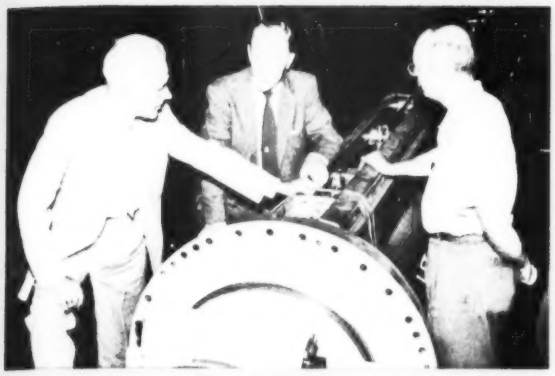


SCALE MODEL built from Nicolas-Louis Robert's plans for the papermaking machine. This device, invented in 1798, revolutionized the paper industry. Using this machine a semi-skilled workman could produce ten times the amount of paper produced by the hand-mold method.



VAT, LIFTING BOX and Knotter dating from 1832 are demonstrated by Dr. Irving H. Isenberg *(l)* and John W. Swanson, Institute staff members. Thus equipped, three skilled workmen could produce four to six reams a day.

JAPANESE VAT and mold, presumably for the production of paper windows for old-time Japanese homes. One such mold, shown here with Marcia Pheifer, library assistant, is capable of producing sheets measuring 30 x 70 in.



CENTRAL FIBRE PRODUCTS COMPANY's Denver Superintendent, G. L. Hendershot *(center)*, discusses the grinding of suction roll packing with F. R. Erbach, Beloit sales engineer *(left)* and M. F. Cook, Beloit erector *(right)*. Mr. Cook's hand is resting on a silencer strip.

SIXTY-INCH VAT provides background for shop conference on Beloit's main erecting floor. Shown with Ralph Wilkins *(c)* vice president, Bird and Son, are Dick Smith *(l)*, and Cash Whipple *(r)* Beloit sales engineers. Mr. Wilkins visited Beloit to discuss jobs now in process for Bird.

SHOWER OF SPARKS marks the pouring of the first dryer in the new dryer and roll-casting shops, Beloit Iron Works foundry. The second cupola began production after Labor Day, and by the time this issue of the Beloit Album reaches you Beloit's new foundry on the banks of the Rock River will be in full-scale production.

VISITORS FROM ABROAD, Jean Arguillere *(c)*, mill director of Papeteries de La Chapelle, France, and Dr. Rudi Wettstein *(r)*, director of Paper Industries, Ltd., Zurich, with Beloit representative C. K. Pfrangle, at Beloit. The dryer back frame shown is similar to the one being installed on La Chapelle's new 290" newsprint machine.

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WHEN YOU BUY BELOIT . . YOU BUY MORE THAN A MACHINE

J. W. MILLER

INSPECT, CLEAN, REWRAP. Bob Zuehlke, bearing buyer, and Melvin "Red" Cobb, bearing stockkeeper, are shown at the cleaning tank with a suction roll bearing in the bearing stock room, Beloit Iron Works, Beloit, Wisconsin. This stock room is maintained exclusively for storage of bearings. Although humidity is strictly controlled, each bearing is periodically checked, cleaned, and rewrapped in special papers to insure against any rust or corrosion. Beloit's bearing inventory covers all types and sizes of bearings used on Beloit machines. The largest bearing is a 29½" bore double row spherical bearing for a suction couch roll. This bearing weighs 1654 pounds. The smallest bearing is a ½" bore needle bearing weighing only a few ounces for use in guides. This impressive bearing inventory enables Beloit Iron Works promptly to supply emergency needs of its customers. Another view of Beloit as "your partner in papermaking."

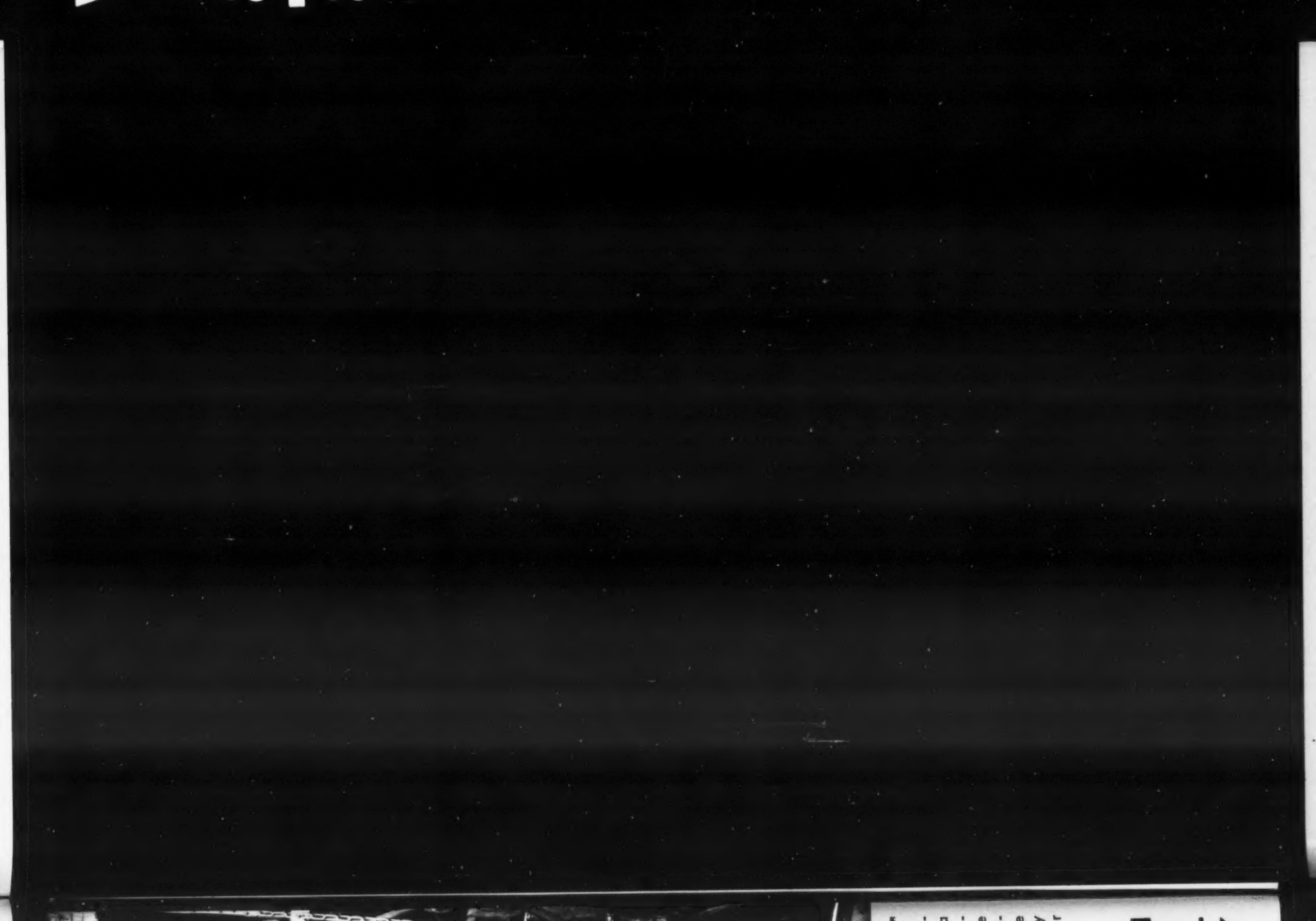
your partner in papermaking

BELOIT

PAPER MACHINERY

BELOIT IRON WORKS · PAPER MACHINERY · BELOIT, WIS., U.S.A.

WHEN YOU BUY BELOIT . . . YOU BUY MORE THAN A MACHINE



NEWS of the INDUSTRY

J. & J. Rogers Plans Early Construction for Colorado Mill

Construction of the first newsprint mill in the Rocky Mountain region is expected to get underway no later than the spring of 1957. Operation of the plant, which is being built by J. & J. Rogers Co. of Au Sable Forks, N. Y., is scheduled for late next year.

The mill will utilize a 166-in. Black-Clawson cantilever type fourdrinier machine manufactured at B-C's Paper Machine Div. in Watertown, N. Y. The unit is to be designed for the production of standard 32-lb. newsprint at speeds of up to 1500-fpm. Total daily capacity will be 135 tons.

In addition to the fourdrinier, pulpwood grinders from B-C's Pandia Div. are being engineered and installed by the Black-Clawson organization.

Preliminary engineering and design has been completed by Alvin H. Johnson & Co. of New York, N. Y.

Pulp Prices Firm

Pulp prices will be firm in the fourth quarter, according to trade sources quoted recently by the *Financial Post* in Toronto.

The reasons given for the outlook include: (1) that demand is still strong; (2) that most grades of paper and board are firm, and (3) that there has been no change in import prices from Scandinavia.

Pulp output in most grades is being pushed to record levels by demand pressure.

St. Regis Buys Lumber Firm; May Build Mill In Western Montana

More than half the shareholders in J. Neils Lumber Co. have approved a plan whereby the firm will be acquired by St. Regis Paper Co. The transaction is to be on the basis of 2½ shares of St. Regis common for each share of Neils common.

Neils Lumber, founded in 1895, operates sawmills at Klickitat, Wash., and at Libby and Troy, Mont. The company also controls dry kilns, planing mills, lath mills and box plants. A nationally known lumber distributor, the firm also produces and treats poles for public utility power and telephone lines.

Approximately 300,000 acres of timberlands, of which 200,000 are locatd in the vicinity of the Kootenai River in western Montana and the remainder in the drainage area of the Klickitat River of southern Washington, are owned in fee by Neils. These lands contain one of the largest single stands of saw timber in private ownership in the Northwest, in addition to substantial amounts of pulpwood.

Plans Pulp and Paper Mill

Roy K. Ferguson, president and board chairman of St. Regis, has recently stated that the quantity of pulpwood species available in the Montana lands would support a 400-ton pulp and paper mill in the area. And construction of such a mill is contemplated if the acquisition of a substantial amount of Neils stock is consummated. (The offer may be declared effective if not less than 80 per cent of Neils stock is voted in favor of the action.)

Promptly following the acquisition, St. Regis will install barkers and chippers at the Neils sawmills in Washington and Montana. Wood chips thus produced will be shipped to St. Regis' mill in Tacoma.

Acquires Cambridge Corrugated

St. Regis has also announced that it has acquired all the capital stock of Cambridge Corrugated Box Co. of Cambridge, Ohio. The firm manufactures corrugated boxes that are

ONE OF THE most modern research and engineering laboratories in the paperboard field was recently opened by Sutherland Paper Co. in Kalamazoo, Mich. The 28,000-sq. ft. structure cost $500,000, is air conditioned and completely fireproof. Housed in the building are pilot equipment; a pulp laboratory; a fireproof vault for the storage of records; a fireproof product laboratory; executive offices and conference rooms; an engineering drafting room; a chemical research laboratory, biochemical laboratory, food technology laboratory; a technical reference library; a darkroom, and a constant temperature and humidity room. Also located in the research and engineering center is the safety and medical department.

used in the shipment of industrial products.

Cambridge will operate as a subsidiary of St. Regis Container Corp. Donald R. Foster, founder of the company, will continue in an executive capacity.

Newsprint Plans Not Definite: Hudson P&P

No final decision has yet been reached as to the proposed Hudson Pulp & Paper Corp. newsprint mill at Palatka, Fla. A spokesman for the firm reported recently that the market potential is still being investigated. The plant would cost approximately $25,000,000.

"The project remains in the process of study and negotiation," said Joseph M. Mazer, treasurer of Hudson. "We had hoped that we would be further advanced than we are."

The company—which does not now produce newsprint—announced plans for the Palatka mill in June following conferences with southern newspaper publishers in Atlanta. At that time it was announced that construction would begin next year on a plant with an annual capacity of 100,000 tons.

In a recent interview, Mazer declared that, "Some people got the mistaken impression that the June announcement was a final decision." He added that, "The plan has not been completely dropped at all, but we are not pushing it either."

Northwest Paper to Expand Production in $5,000,000 Project

The Northwest Paper Co. in Cloquet, Minn., has announced that it will expand its facilities at a probable cost of more than $5,000,000.

More than half of the expenditure will cover the installation of a new paper machine recently ordered from Beloit Iron Works. No decision has been reached as to whether to install the unit at Cloquet or at Brainerd. (Four machines are now in operation at Cloquet, only one at Brainerd.)

The Beloit unit will have an initial daily capacity of 150 tons, increasing the firm's total capacity by more than 33 per cent. Delivery of the machine was expected in just over two years.

Although initially the company plans to obtain pulp supplies for the Beloit unit from market sources, its installation "will doubtless mean the installation of additional pulp production capacity at some subsequent time," according to Stuart B. Copeland, president of the firm, who further foresaw the need for a seventh paper machine.

Waskesiu Construction Scheduled for Early '57

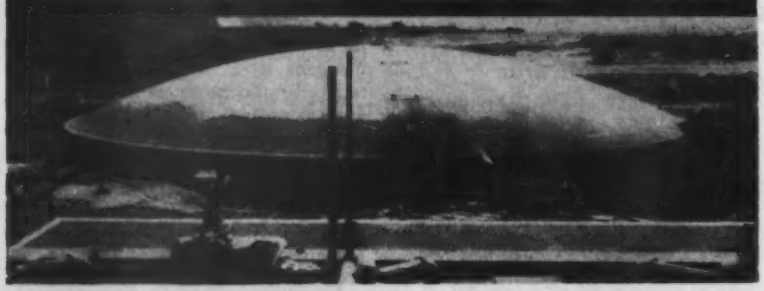
The $60,000,000 pulp mill project of Waskesiu Forest Products Ltd. at Prince Albert, Sask., will enter the construction stage early next year. This according to an announcement by Robert G. Campbell of Vancouver, B.C., president of the firm.

About $200,000 has been spent on preliminary work, and confirmations of prices have been received for all equipment and necessary materials.

The pulp mill itself will cost $34,750,000. The balance of the $60,000,000 will be spent for rail facilities, logging camps, inventory, base camps and other needs.

In his announcement, Campbell confirmed an earlier statement that the operation would provide pulpwood in perpetuity through the strip method of cutting. He further stated that substantial quantities of natural gas will be used. As for electrical energy, he added, if the Saskatchewan provincial government could not supply it cheaply enough, Waskesiu would endeavor to produce its own.

REMARKABLE PRELOAD TANK



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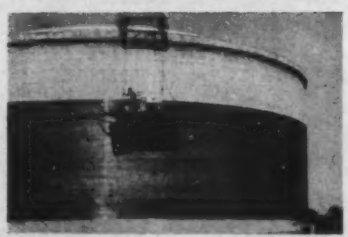
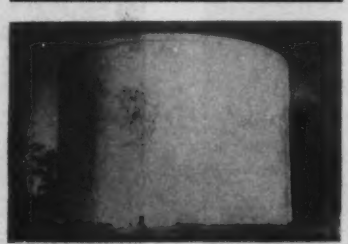
30% CONCRETE





Concrete bonded with high tensile wire reinforcement applied by the PRELOAD SYSTEM with a tension of 140,000 psi permits these tremendous material savings and more. PRELOAD tanks are suitable for the many process and storage tanks required by the paper manufacturing industry.

PRELOAD ADVANTAGES

- Maintenance-free structure. Nothing to deteriorate or protect.
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Brown Co. Awards Contract for Waste Utilization System

Utilization of normally waste liquors and the reduction of stream pollution will result from the major conversion project now underway at Brown Co. in Berlin, N. H. The 350-ton sulfite pulp mill is believed to be the first eastern plant of its kind to be converted to the new magnesium base process.

Facilities that will permit now unused by-product liquors to be converted into steam-producing fuel are to be installed by the construction department of Merritt-Chapman & Scott Corp. of New York, N. Y. Both steam and chemicals will be extracted in the process.

By-product liquors are diverted into an evaporator instead of being disposed of as waste and are converted into fuel as a supplementary source of power; while the cooking chemicals are later isolated and returned to the process.

Conversion of the mill is expected to be completed within a year without materially interrupting pulp production.

Cola Parker Sees Need for Economic Slow-Down

That the nation's galloping economy needs to slow down and digest its progress was the view expressed recently by Cola G. Parker, former president of Kimberly-Clark Corp. and its board chairman. He spoke in Atlanta as president of the National Association of Manufacturers.

Parker said, however, that he expects a continued rise during the fourth quarter of 1956. The "leveling off" in his opinion will occur "about the middle of the spring of 1957." He based his prediction on the length of time since the "last digesting period" and the percentage of increase in economic conditions. "We can't continue to increase at 7 per cent a year," he said.

The digesting period might last as long as 18 months, Parker said, "but it won't hurt. Even if we drop to a 1 per cent increase over 1956, we are still in good condition. A slowing down period is necessary periodically."

The speaker was critical of continuing wage increases and "monopolistic unions." The greatest single threat to the nation's economic health, he said, is that "wage increases are running above productivity."

IN A PEACEFUL cove, "Hotel Ocean Top View" is ready for operations among Maine's thousands of wood-covered islands.

Floating Lumber Camp Harvests Off-Shore Timber in Maine

ST. REGIS PAPER CO. has gone to sea in search of pulpwood. With oil, it's the floating oil rig. With pulp and paper, it's the floating lumber camp.

St. Regis is the force behind what may be America's only seagoing woods camp, according to the Maine Department of Industry and Commerce at Augusta.

The rig is an old-fashioned woods camp lying among the thousands of wooded islands that dot Maine's rock-bound coast. The floating camp is no throwback, however. It was constructed five years ago for a perfectly good economic reason.

In charge of "Hotel Ocean Top View" — as the camp is called — is Wilfred Pepper of Watterville, a woods boss from 'way back.

A Money-Saver

Pepper had been cutting pulpwood on Maine islands for 10 years when he came up with a money-saving idea: surplus government barges could be made to serve as a permanent camp that could be towed from island to island and anchored just off shore.

Until that time, crews had had to land on an island and construct an entire camp (bunk houses, a cook house and camp office, etc.) before work could begin. Islands with timber for only a few weeks' cutting were passed by. Camps that were built were abandoned when cutting operations were completed. The process was time-consuming *and* expensive.

Hotel Ocean Top View was the result. With pulpwood-carrying barges attached, it covers about an acre.

Just Like Home

The "woods camp" is constructed on a barge 110 ft. long and 31 ft. wide. The 26-by 30-ft. cook house is equipped with a hotel-size gas range, a wood-fired cook stove, a huge food freezer, refrigerator and all the other facilities of a modern hotel kitchen.

Next on the camp barge is the power plant, which furnishes 110-v electricty for lighting, radios and all the other "incidentals" that make camp life at sea much like camp life on old terra firma.

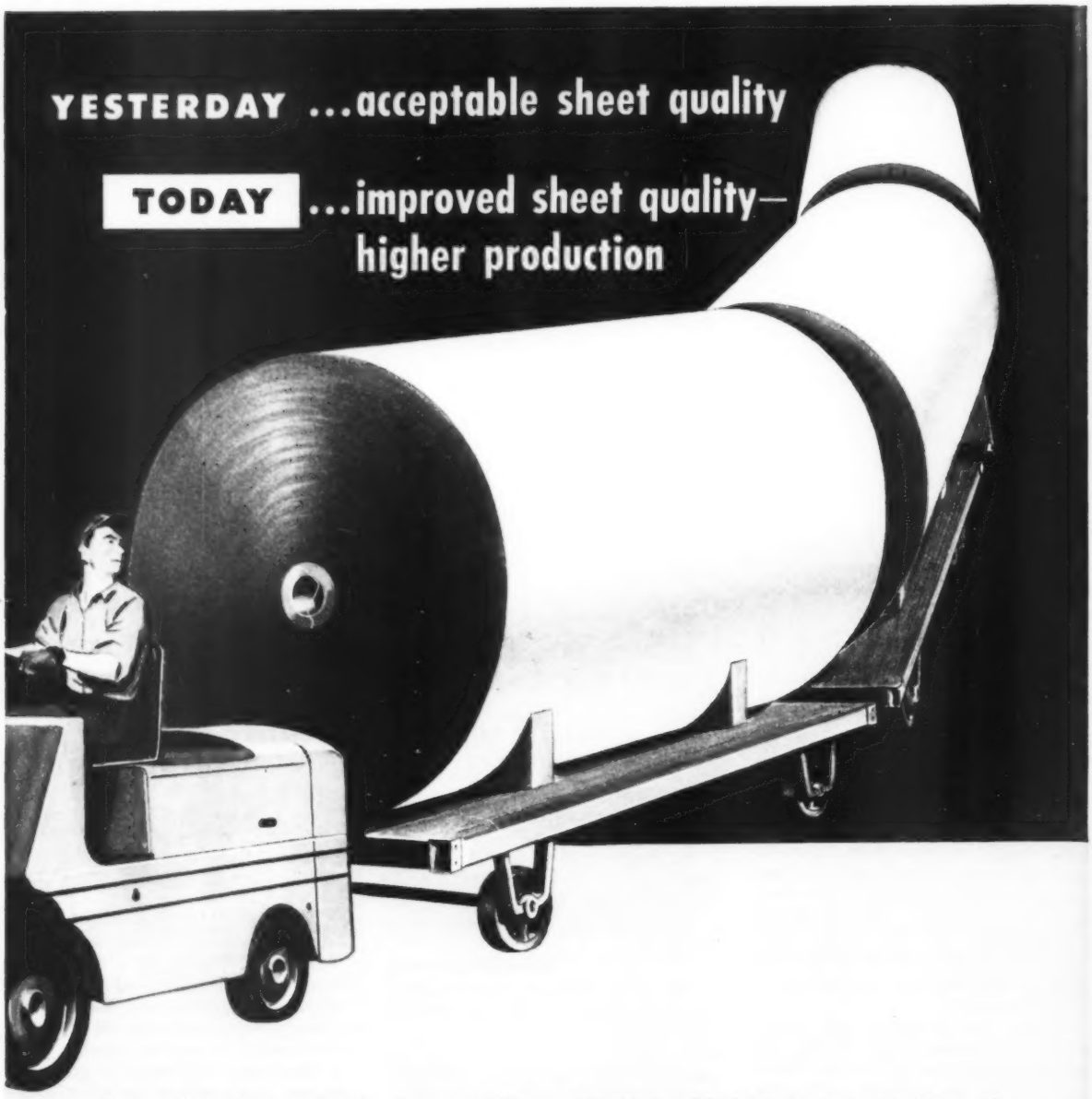
Further on are the camp office and store, while the crew's bunk house (26- by 30-ft.) has been built on the stern. Army surplus double-decker bunks provide sleeping space.

All the buildings are constructed in much the same way as regular woods camp structures, with heavy tar paper over side walls and roofs.

Against the Tumultous Sea

Close alongside is a barge of equal size loaded with pulpwood boomed out from shore. When fully loaded, it is hauled by the 70-ft. tug *David* to the St. Regis mill at Bucksport.

Still another barge is used as a



The machine that produced a commercially acceptable sheet a few decades ago may fail to meet the new demands of today's competitive market. Or if quality is pushed higher, production may be too slow for profitable operation.

A new Puseyjones Machine can give you the high quality paper you want, in greater tonnage, with better profits. And your Puseyjones Machine is your assurance of meeting tomorrow's still higher production demands. That's because the finding of new pathways to increased speeds and larger profits is a 90-year-old tradition at Puseyjones.

When you need a new machine . . . or the modernization of an old one . . . you need the help of Puseyjones engineers. That help is yours for the asking. Call or write us today.

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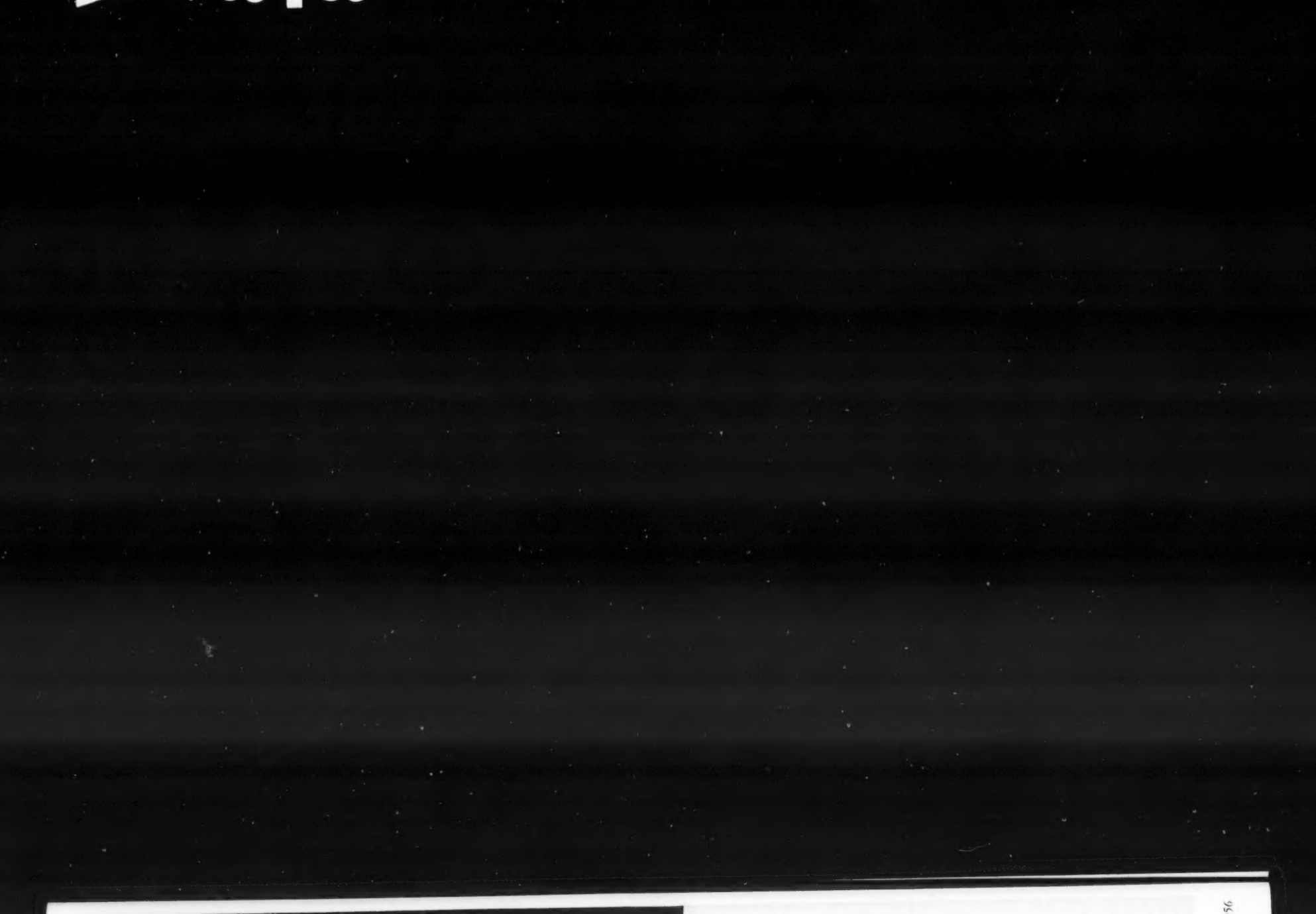


loading unit. A ramp and chain dragline installed on this third member of the fleet takes wood from the water and dumps it into the larger pulpwood-carrier.

Pulp cut on the island is moved to the shore and dumped into a log boom about 100 ft. square. The boom encloses approximately 75 cords of 4-ft. wood. The boom and its "cargo" are moved by tug to the loading barge, where lumberjacks with pike poles guide the logs onto the chain. Once dumped into the pulpwood-carrying barge, crewmen stack the logs for the trip to the mill.

Hotel Ocean Top View's season extends from mid-May until cold weather and storms send it to moorings for the winter. It successfully rode out the hurricanes of 1954.

Once the "entourage" is positioned, Pepper lets go the six huge anchors. So far, the grapples have held the "camp" against anything the tumultuous Maine seas have been able to offer.

Canada Fire Loss Above Average

Fire losses in Canadian forests last year ran high above the annual average for the 1946-55 period.

Timber losses topped $7,100,000, more than twice the average; while fire-fighting costs reached $6,500,000, three times the average.

Fire causes during 1955 were as follows: Careless smokers (19 per cent); camp fires (14); settlers (10); railways (9); lightning (30); industrial operations (5); incendiary (2); public works (1); miscellaneous (6), and unknown (4).

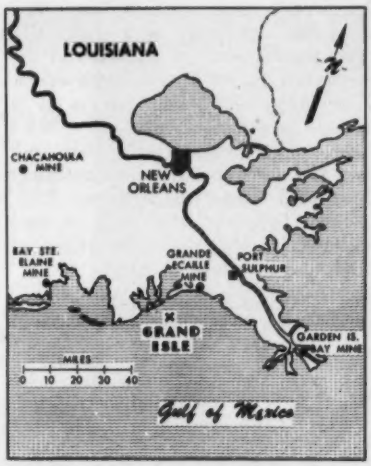
Freeport Undertakes Off-Shore Sulfur Mining Operation

The first completely off-shore sulfur mining operation in history will be undertaken by Freeport Sulphur Co. at a deposit discovered in the Gulf of Mexico by Humble Oil & Refining Co.

The deposit, located 6 miles off Louisiana in 45 ft. of water, represents "a major new source of sulfur," according to a joint announcement from Humble and Freeport.

Under a contract signed by the two firms, Freeport will design, install and operate a mining plant to produce sulfur by the Frasch hot water process. Construction is required to begin by the latter part of 1958 and is expected to take two years.

The sulfur was found approximately 1700 ft. below the floor of the Gulf



GRAND ISLE ("X") location where Freeport will build the first completely off-shore sulfur mining plant in history

in the caprock of a salt dome, a geological formation commonly found in the Texas and Louisiana gulf coast area.

Freeport has developed and successfully operated three sulfur mines in the coastal marshes. Two of the mining plants were erected on 75- to 95-ft. pilings, and the third was built on a barge, floated to the site and sunk in place. The company also pioneered in the use of seawater in the Frasch process and the marine transportation of sulfur in molten form.

CIP Unveils Former Brown Mill's New Look

The former Brown Corp. mill at La Tuque, Que., has been officially unveiled by Canadian International Paper Co. following a $20,000,000 expansion and modernization project. (CIP purchased the mill and woodlands from Brown two years ago.)

The plant now produces kraft board and paper. Prior to the expansion, production consisted entirely of kraft pulp. Capacity has been increased to 263,000 annual tons, of which 115,000 is kraft board and paper.

Further Details Reported In Westvaco Expansion

West Virginia Pulp & Paper Co. has revealed further details in connection with the recently announced $50,000,000 expansion at Luke, Md.

The most extensive expansion ever undertaken by the firm at one location, the program will transform Luke into "one of the most modern and efficient mills in the country."

Present plans call for the installation of two large paper machines each

capable of speeds of up to 2500 fpm. One will produce coated, while the other will produce uncoated papers. These units, along with the expansion of other facilities, will ultimately boost Luke production to more than 800 daily tons — roughly double the present capacity.

The West Virginia board of directors approved the project shortly after the Maryland Water Pollution Control Commission gave its o.k. to proposals to treat wastes in a modern treatment plant capable of handling effluent from both the current production and the output of the proposed equipment. The waste abatement project, which will actually improve the present condition of the stream, will cost an estimated $3,000,000, more than any other firm in the industry has ever invested in a similar program.

Additional Expansion

Under the proposed program, enlargement of facilities is expected to take place in every phase of the mill's operation. This includes expansion of the woodyard and chip house operations and additions to the washing, screening and bleaching facilities. More digesters will be installed, as will a new evaporator, a high-pressure recovery smelter and a new lime kiln. Other additions will be made to the liquor recovery cycle, and the chlorine plant will be enlarged and perhaps relocated.

A new turbine and boiler will be installed, and facilities will be increased for stock storage and refining

SLITTER-REWINDER that recently went into production at Ecusta Paper Corp. in Pisgah Forest, N. C., has a 42-in. rewind capacity and operates at speeds of up to 2000 fpm. The unit is 102 in. trim, and the unwind stand has an air-operated water-cooled brake complete with constant-tension device. Ecusta, a leading producer of cigarette papers, is using the machine for slitting a rewinding various grades of lightweight tissues and papers.

as well as for coating, calendering, finishing and shipping.

U. S. Lab Develops Cold Soda Process; Result—More Newsprint

This country's vast hardwood timberlands seem destined for newsprint production as the result of research recently completed at the U.S. Forest Products Laboratory in Madison, Wis.

The development — known as the "cold soda process" — is to be employed early next spring in the first commercial newsprint operation of its kind in the United States. The mill involved will be Coosa River Newsprint Co. in Coosa Pines, Ala. Hardwood species native to the area will be used. (Coosa River is partially owned and wholly operated by Kimberly-Clark Corp.)

Capacity of the installation has not been disclosed, but company officials did report that is is being designed for expansion.

Process Called Less Expensive

Manufacturing newsprint from hardwoods is not new by any means. However, the cold soda process is claimed to be less expensive than any of the previous methods. The new process, according to Kenton J. Brown, appears to be the least expensive of the chemical pulping proceses for newsprint manufacture from either soft or hardwoods. Brown is a chemical engineer at the Forest Products Laboratory.

He has estimated that cold soda pulp will cost about 10 per cent more than groundwood pulp.

(Most newsprint used by United States dailies is comprised of about 80 per cent groundwood pulp and 20 per cent sulfite pulp. Both types have been produced from softwoods. Southern mills have replaced the sulfite mixture with a sulfate pulp made from southern pine.)

Wood Loss Reduced

Brown explained that both sulfite and sulfate pulps are more expensive than the groundwood pulps, due partly to the fact that about 50 per cent of the original wood is lost in chemical processing; while only about 5 per cent is lost in the mechanical groundwood process.

The cold soda process, according to Brown, loses only about 10 per cent of the wood. Thus, its cost is substantially lower than either sulfite or sulfate. In addition, cold soda consumes less chemicals.

In the cold soda process a caustic soda solution is used to soften the hardwood chips, which are then fiberized into pulp in a disk mill. The process was first unveiled at the laboratory in 1950 as a batch operation. The continuous process is a recent development.

A commercial-size cold soda mill was put into operation in September by Gould Paper Co. at Lyons Falls, N. Y. However, the pulp is used exclusively for the production of high-quality printing paper.

"Chemigroundwood" at Great Northern

In the U. S. only one newsprint producer uses hardwoods for newsprint pulp — Great Northern Paper Co. at Millinocket, Maine. The firm has been employing the "chemigroundwood" process for more than two years on beech, birch and maple. It combines a chemical softening of large blocks of wood with the regular groundwood process.

Coosa River will be the first to produce cold soda newsprint pulp from hardwoods.

Meanwhile, Bowaters Southern Paper Corp. is constructing a pilot plant at Calhoun, Tenn., to test both the cold soda and the semichemical neutral sulfite processes on hardwoods for newsprint. It is expected that the pilot plant will be in operation by the first of the year.

Also a development of the U. S. Forest Products Laboratory, the neutral sulfite process is currently used by 35 U. S. mills in the production of container board and high-quality printing papers from the hardwoods. However, no U. S. mill is using the method commercially to make newsprint. The only North American mill doing so is Richmond Pulp & Paper Co. of Canada Ltd. at Bromptonville, Que.

News of the Industry . . .

Three Factors Assure Bright Future: Lozier

Three factors assure "a bright future for the paper industry," according to Kenneth D. Lozier, vice president of St. Regis Paper Co., in a recent address at Bridgeport, Conn.

The factors cited by Lozier were: (1) the increased standard of living of the growing population; (2) the combination of paper with other materials and the development of new uses for paper, and (3) the industry's mature, stable management.

As evidence of the confidence with which the industry faces the future, Lozier cited the capital expenditures planned by St. Regis. Such spending will total approximately $166,000,000 through 1959 and will increase the firm's production of printing and publication papers by 21.9 per cent and of kraft paper and board by 95 per cent. The speaker predicted that paper will continue its highly accelerated rate of growth because of its great versatility and adaptability.

Many new paper products are on the horizon due in part, Lozier stated, to the industry's close relationship with the chemical industry. Chemicals are adding new dimensions and qualities to paper, with the result that new kinds of paper and new and unusual uses are reaching the market.

Over the next two years the industry plans to spend $1.3 billion to

SIX-COLOR Staude 1000 gravure press with tandem cutting and creasing press that has recently been installed at the American Coating Mills plant of Robert Gair Co. Inc. in Elkhart, Ind. With a continuous web of boxboard feeding in at one end, the new unit first prints it at a speed as great as 1000 fpm, then cuts it into carton blanks and finally strips the excess boxboard surrounding the individual blanks. The finished blanks, ready for folding, gluing and packing, stream from the delivery end at the rate of several hundred thousand per hour

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Advanced Production Methods—like those employed in the McIntyre, Ga. plant shown above. Quality control—an *every-minute* activity and responsibility—assures the finest paper clays modern technology can produce.

Quality Assurance—In the third picture, an M & C technologist in Georgia does "guard duty" for a paper company a thousand miles away. No car of Edgar Clay leaves the plant until the laboratory runs a complete evaluation and okays its contents. This puts *us* on *your* quality control team.

We Invite You to utilize this most modern source of paper clays and technical service. The coupon will suggest a starting point.

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expand production capacity by 2,300,000 tons — or 8 per cent. In view of recent estimates that world demand for paper products will increase by 3,000,000 tons during the same period, Lozier declared that the danger of the industry's constructing too much capacity seems slight. The long-term outlook, he added, is excellent, both on the domestic and international front.

AICE to Feature Pulp and Paper Session

A symposium on chemical engineering in the pulp and paper industry will be one of the features of the 49th annual meting of the American Institute of Chemical Engineers. The gathering will be staged at the Hotel Statler in Boston December 9-12.

The symposium will cover several phases of the pulp industry, with special reference to its future in management, capital investment, the training of chemical engineers at undergraduate and graduate levels, and research.

Participating in the symposium will be E. C. Bowen of Bowen Corp. (chairman); J. W. Hemphill of the Pulp & Paper Div. of Johns-Manville Corp.; Harold G. Ingraham of the Pulp & Paper Div. of Charles T. Main Inc.; W. A. Ketchen of Fraser Companies Ltd.; W. Pittam of the Pulp & Paper Div. of Stone & Webster Enginering Corp., and Robert A. Springer of Diamond Alkali Co.'s research center.

Papers that will be presented during the meeting include: "The Pulp and Paper Industry" by George Olmsted Jr., president of S. D. Warren Co.; "Undergraduate Training in Chemical Engineering" by Prof. Lyle C. Jenness of the Department of Pulp and Paper Technology at the University of Maine; "Graduate Training in Research and Chemical Engineering" by Roy P. Whitney of the Institute of Paper Chemistry, and "Revolutionary Trends in Pulp and Paper Technology" by Dr. Lincoln R. Thiesmeyer, president of the Pulp & Paper Research Institute of Canada.

News of the Industry . . .

Recent Expansions in the Industry

W. R. Grace & Co.
of New York, N. Y., is building a pulp and paper mill at Arecibo, Puerto Rico, that will use bagasse as raw material. The $8,000,000 plant will produce wrapping paper, corrugated cartons and paper bags.

Thilmany Pulp & Paper Co.
has let the contract for the construction of a combined storeroom and warehouse at its Lower Mill in Kaukauna, Wis. The building will cost more than $100,000. (The firm is now in the process of building facilities to house the 165-in Yankee fourdrinier that it will install in the near future. The machine will incorporate the largest MG dryer in North America.)

Flintkote Co.
has purchased Van-Packer Corp. of Bettendorf, Iowa, the world's largest manufacturer of pre-fabricated chimneys. According to a spokesman for Flintkote, acquisition of Van-Packer is in line with Flintkote's program of expansion and diversification. V-P's products are an integral part of the building industry, as are those of Flintkote. Furthermore, the Iowa firm consumes a substantial amount of asbestos fibers, which can now be obtained from Flintkote mines in Thetford, Que.

Robert Gair Co. Inc.
has acquired a 9-acre industrial site in Grand Rapids, Mich., where it plans to construct a carton plant to house the Grand Rapids branch of its American Coating Mills Div.

Charmin Paper Mills Inc.
of Green Bay, Wis., was to begin construction this fall of a two-story wood room for its Division "B" plant. Four new chip bins will be housed in the steel and cement block building.

Badger Tissue Mills
of Kaukauna, Wis., is constructing a 94- by 105-ft. addition at a total cost of about $50,000.

Anglo-Newfoundland Development Co. Ltd.
will go ahead with plans for the construction of a pulp and paper mill near Sioux Lookout, Ont., according to Clare Mapledoram, provincial minister of lands and forests. Anglo-Newfoundland, according to Mapledoram, has deposited a $250,000 performance bond with his government. (Sioux Lookout is 170 miles northwest of Port Arthur.)

Columbia Cellulose Co. Ltd.
at Prince Rupert, B. C., boasts excellent growth prospects, according to Harold Blancke, board chairman. The mill, he said, has been redesigned to allow production of paper pulps and dissolving pulps for rayon manufacture. The parent firm, Celanese Corp. of America, plans to spend $100,000,000 on capital expansion over the next five years.

Stevens Paper Mills Inc.
of South Hadley Falls, Mass., will construct a $31,000 reinforced concrete filter plant.

United Wallpaper Inc.
of Joliet, Ill., is now controlled by Sears, Roebuck & Co. Stockholders voted overwhelmingly in favor of the action, which calls for United Wallpaper to operate eight paint and wallpaper plants formerly operated by Sears. United's headquarters is to be moved to the Sears research laboratory in Chicago.

Pollock Paper Corp.'s
Waterproof-Ohio Div. in Middletown, Ohio, will add some 12,000 sq. ft. to its plant at a cost of $600,000. New equipment, including a rotogravure press. will bring the over-all cost of the expansion to about $1,000,000.

Allied News Briefs . . .

The board of directors of **Hooker Electrochemical Co.** and **Oldbury Electro-Chemical Co.**, both of Niagara Falls, N. Y., have approved a formal agreement for the consolidation of the two firms. The move is subject to stockholder approval.

The Black-Clawson Co. has removed the administrative, engineering and sales offices of its Pandia Div. from New York, N. Y., to Hamilton, Ohio. The move was made in line with the firm's policy of maintaining each divisional headquarters in the proximity of its related manufacturing facilities.

Stein Hall & Co. Inc. has officially opened its new Charlotte, N. C. plant, office, laboratory and warehouse building. The $250,000 facility manufactures resins for a num-

Fewer replacements...more profit with TISCO Cast Alloy Wear Parts

TISCO Demountable Plug Sleeve—only 3 bolts to remove

Do you have a severe wear problem in pulp or paper mill equipment? If you do, it will pay you to investigate the extraordinary qualities of TISCO Manganese Steel and other TISCO Cast Alloy Wear Parts. The leading mills in this country and abroad make substantial savings in maintenance costs through the use of TISCO Cast Alloys.

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BUTT WELDING FITTINGS

½ inch through 42 inches . . .

FORGED CORROSION RESISTANT—LIGHT WEIGHT and A.S.A. FLANGES

½ inch through 24 inches . . .

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LONG WELDING NECKS up to 24 inches, 150 lb. through 2500 lb.

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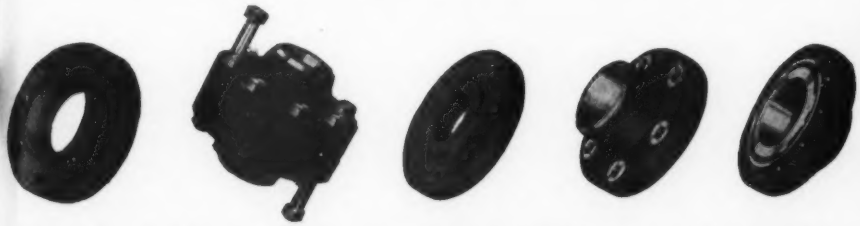
Schedules 5S, 10S, 40S, 80S, and other Schedules and wall thickness.



FORGED CORROSION RESISTANT—LIGHT WEIGHT and A.S.A. FLANGES

150 lb. through 2500 lb. pressure ratings.

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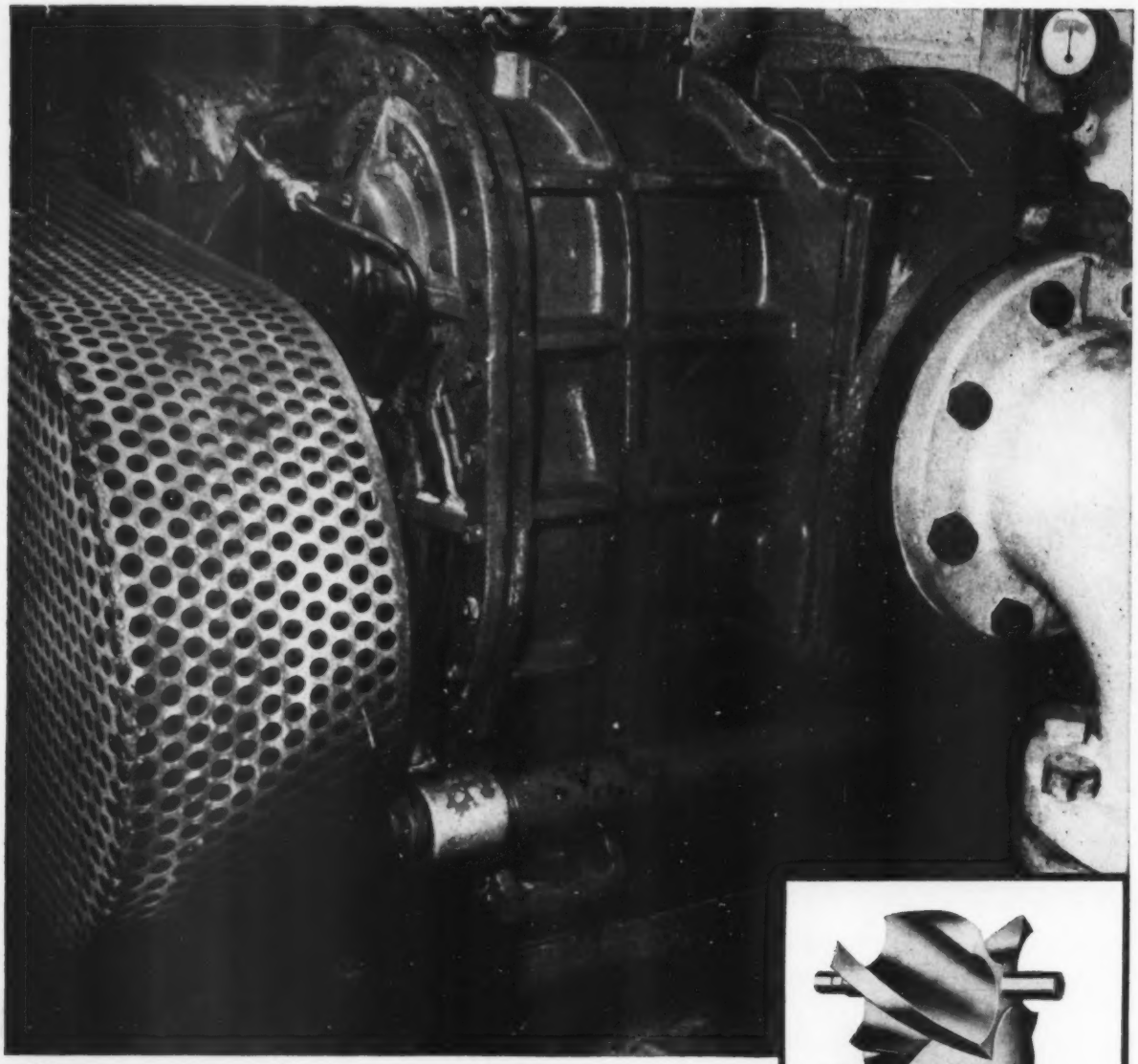


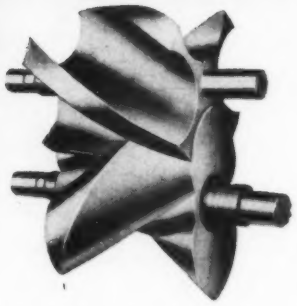
Standardaire pump solves drying and foaming problems . . . cuts maintenance for specialty paper producer

Uneven drying and heavy foaming problems resulting from vacuum fluctuations presented serious obstacles to Raybestos-Manhattan, Inc., in the production of its new, single-fiber asbestos paper.

A Standardaire vacuum pump, installed originally on a 4-month trial basis, entirely eliminated these difficulties. The unit, requiring only half of the area of the former pump, provided a constant vacuum, making possible an uninterrupted flow between the pulp vat and the final windup drum.

Now, after nearly four years of operation, often in excess of rated capacity, this unit still is in prime condition. No maintenance has been required other than lubrication at 3-month intervals.

The compact Standardaire offers greater capacity per pound of pump, with less power consumption, than other units of equal size and weight. Find out how they can help solve your problems. Write for your copy of illustrated bulletin B-154 which provides specifications and operating data.



The Standardaire's even vacuum and high capacity are the result of its exclusive cycloidal, screw-type rotors which compress air in a wide range of pressures with a minimum of internal leakage. Since rotors never touch, there is no friction, no wear or need for internal lubrication.

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ber of industrial applications and a variety of formulations for warp sizing, printing, finishing and other steps in textile production, in addition to a line of liquid adhesives.

Beckman Instruments Inc. has made acquisition of Lou-Bar Products, Santa Monica, Cal. manufacturer of precision components.

Yale & Towne Mfg. Co. will construct an industrial lift truck sales and service branch in Los Angeles as the first step in an extensive western expansion.

American Cyanamid Co. is building a plant for the production of liquid alum in Cloquet, Minn.

The Jeffrey Mfg. Co. of Columbus, Ohio, has opened a San Francisco warehouse, which also houses the firm's San Francisco sales.

Farrel-Birmingham Co. Inc. has transferred its roll grinder sales and service from Ansonia, Conn., to the Consolidated Machnie Tool Div. at Rochester, N. Y.

Dresser's Industries Inc.'s Roots-Connersville Blower Div. of Connersville, Ind., is establishing a San Francisco sales office.

Dexter Chemical Corp. of New York, N. Y., has established a paper chemicals division because of the steadily increasing sales to pulp and paper manufacturers.

The Black-Clawson Co. has opened a sales and service office in Atlanta for its paper machine and stock preparation manufacturing divisions.

Pulp Washing to be Theme of U. of Florida Annual Conference

Pulp washing is to be the theme of the Fifth Annual Pulp and Paper Conference to be held at the University of Florida in Gainesville December 3-4.

Chairman of the meeting, which is sponsored by the Chemical Engineering Department and the Pulp and Paper Laboratory, is Dr. William J. Nolan.

Speakers will include: C. E. Textor of the Bauer Bros. Co.; William G. Dedert and H. K. Waters, Swenson Evaporator Co.; Thomas B. Calhoun, Dorr-Oliver Inc.; Malcolm B. Pineo, Brunswick Pulp & Paper Co.; David Wetherhorn of Savannah, Ga.; Bruce Armstrong of Appleton, Wis.; C. W. Converse, Sprout-Waldron & Co.; Dr. J. W. Dunning, V. D. Anderson Co., and M. E. Ginaven and A. H. Adams, Bauer Bros.

Chairman of the session will be Harry E. Weston, secretary and treasurer of the Superintendents Association.

Coming Events

Tappi

Nov. 14-16—Alkaline Pulping Conference, Jung Hotel, New Orleans, La.
Nov. 30-Dec. 1—Southeastern Section, Brunswick, Ga.
Jan. 18-19—Southeastern Section, Jacksonville, Fla.
Mar. 22-23—Southeastern Section, Charleston, S. C.
May 24-25—Southeastern Section, Savannah, Ga.

Superintendents Association

Nov. 29-Dec. 1—Pacific Coast Div. (fall meeting), Multnomah Hotel, Portland, Ore.

Other meetings

Nov. 26-30—Third International Automation Exposition, New York Trade Show Building, New York, N. Y.
Dec. 3-4—Fifth Annual Pulp and Paper Conference, University of Florida, Gainesville

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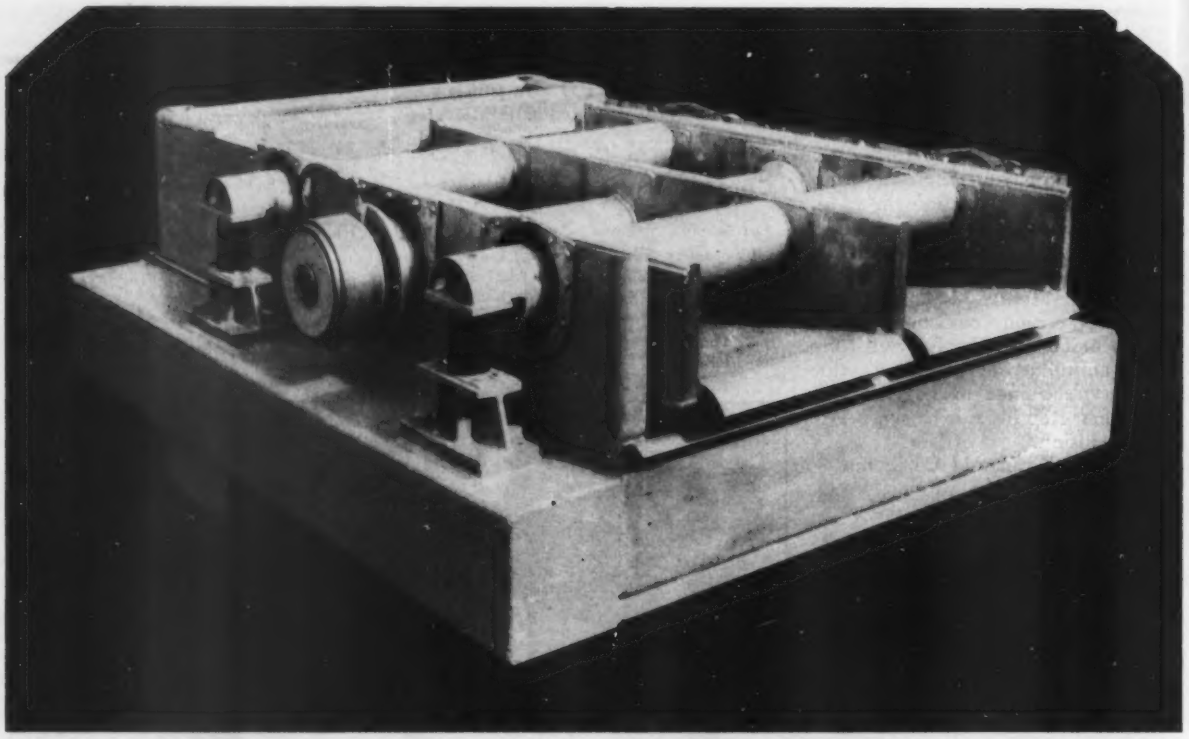

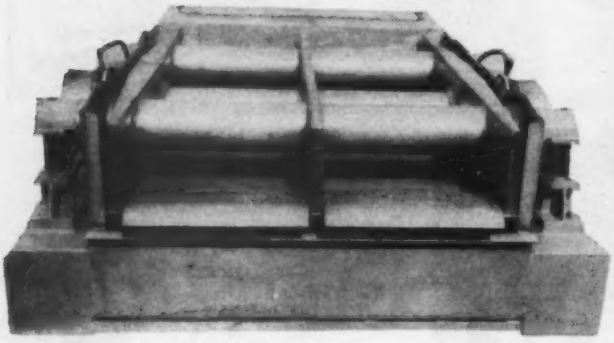

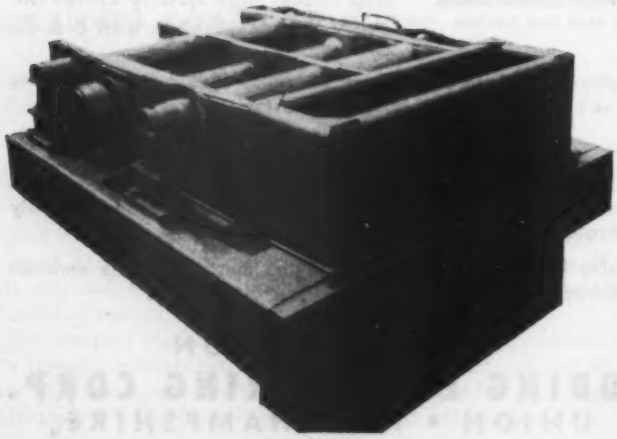

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Here is a unit which contains several new features never before incorporated in knotters. Double wall construction of the stainless vat and center section guarantees extra long basket life. Rubber mounts support the vibrating basket as well as the vat itself, eliminating old-fashioned springs as well as minimizing vibration transmission to the building members. The built-in inlet box lends itself to subfloor piping as does the discharge. Six sectionalized screen plates are advantageous in that plate changes for various fibre clarifications are easily made. Oil mist lubrication, proper seals, and flinger rings protect the antifriction bearings against water, cooking liquors, and hot vapors.

Largest plate area is in keeping with present day peak capacities.

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NAMES in the NEWS

WHEN THE PROPOSED sulfate pulp mill of Bowaters Carolina Corp. at Catawba, S. C., comes into operation, key officials will be on hand: T. C. Bannister, sulfate superintendent at Bowaters Southern Paper Corp. in Calhoun, Tenn., will be mill manager; and H. C. Carruth, Calhoun assistant woods manager, will serve in a similar position at Catawba. In the photograph are (l to r): Chancey D. Gregory Jr., president of the Lancaster, S. C. chamber of commerce; Carruth; Bannister; John A. Hardin, president of the Rock Hill chamber, and K. O. Elderkin, vice president and general manager at Calhoun

Institute Names Trustees

The Institute of Paper Chemistry at Appleton, Wis., has announced the election of three new members to the board of trustees:

M. C. McDonald, president of Great Northern Paper Co., and Howard E. Whitaker, president of the Mead Corp., both of whom will serve terms expiring in 1961; and Dr. H. W. Bialkowsky, director of research for Weyerhaeuser Timber Co.'s Pulp Div., who has been selected by Institute alumni for the newly created post of alumni trustee. Dr. Bialkowsky's term expires in 1959.

A. B. Layton, a vice president of Crown Zellerbach Corp. who has been a trustee for a term now expiring, was selected a senior trustee to fill the unexpired term of the late D. C. Everest. Retiring as a trustee is Sydney Ferguson, board chairman of Brunswick Pulp & Paper Co.

Scott Completes Mobile Staff

Scott Paper Co. has reported final staff appointments for its Hollingsworth & Whitney Div. mill in Mobile, Ala. Personnel will have responsibility for both the present kraft pulp and paper mill and the new tissue mill.

On the administrative side are: R. G. Young, assistant plant manager for production; F. B. Smith, assistant plant manager for services; Robert Schantz, industrial engineer; Smith, personnel manager; J. H. Val Swider, plant accountant; H. J. Coil Jr., assistant secretary, Scott Paper; W. H. King, consumer's representative, and F. E. Stabler, woods manager for the South.

The production staff comprises the following: W. L. Perro, pulp mill superintendent; S. D. Arant, paper mill superintendent (kraft); George Lockbaum, paper mill superintendent (tissue), and C. E. Ridenour, finishing superintendent (tissue).

The services staff includes: C. D. Ingram, technical superintendent; O. W. Jervis, power superintendent; George Ensminger, maintenance manager; R. A. Young, traffic manager; E. M. Scheu Jr., procurement manager, and R. S. Bean, plant engineer.

Federal Paper Board Elects Vice Presidents

The election of three new vice presidents has been announced by Federal Paper Board Co. Inc.

E. Burton Wall has been appointed vice president in charge of eastern carton sales; James C. LaGrua vice president in charge of Midwest operations, and Charles P. Jeppesen vice president in charge of carton production. (All three were moved up from their posts as officers of the National Folding Box Co. Div.)

Federal Paper Board has also announced that Wilfred C. Palmer has resigned as president of the National Folding Box Co. Div. A resident of Philadelphia, he plans to concentrate on special sales activities for the company in the Philadelphia area.

R. A. Halgren has been appointed general manager of Minnesota & Ontario Paper Co.'s National Pole & Treating Div. Formerly assistant general manager, he succeeds the late J. B. Norman.

Richard H. Richmond has been appointed assistant resident manager of the Port Angeles, Wash. Div. of Rayonier Inc. He was formerly associated with Alaska Pine & Cellulose Ltd., a Rayonier subsidiary.

Immediately following an announcement by Owens-Illinois Glass Co. of its merger with National Container Corp., **Hugh C. Laughlin**, executive vice president of O-I, and **Harry E. Collin**, a director and member of the executive committee, resigned as directors and members of the executive committee of Robert Gair Co. Inc.

Archie W. Judson Jr. has been appointed instrumentatoin supervisor for the International Falls Div. of Minnesota & Ontario Paper Co. Mr. Judson is formerly of Standard Oil Co. of Indiana.

Leo A. Warmuth has been named president of W. C. Ritchie & Co., subsidiary of Stone Container Corp. He was formerly assistant to the president of Ulrich Mfg. Co.

H. G. Wintgens has been named to the new position of executive vice president of Charmin Paper Mills Inc. Other officers named by the board of directors are: **J. M. Con-**

way, president; **M. J. Auchter**, vice president in charge of manufacturing; **John Maloney**, vice president, sales; **P. M. Chiuminatto**, secretary-treasurer; **Robert J. Pfotenhauer**, assistant secretary, and Miss **Edna Decker**, assistant secretary.

Charles A. Newman, assistant division manager of the Baie Comeau mill of the Quebec North Shore Paper Co., has been appointed division manager of the mill. Newman succeeds **G. J. Lane**, who is now vice president of the company.

C. A. Newman

J. C. Hodgetts

James C. Hodgetts has been appointed training supervisor for the plants of Robert Gair Co. Inc. Before joining Gair, Hodgetts was professor of industrial management at Rider College.

P. B. Johannessen

H. Allen

Dryden Paper Co. Ltd. has advanced two men. **Per Berg-Johannessen**, chemical engineer in the control department, has been appointed assistant pulp mill superintendent in charge of the bleach plant operations. **Henry Allen**, chemist in the control department, will be laboratory supervisor of the company.

Allied Personalities . . .

Ferri Casciani, former director of the research laboratory of Niagara Alkali Co., has been named supervisor of technical service for Hooker Electrochemical Co.

Calvin A. King has been named assistant to the president and **Henry H. Shepherd** general sales manager of Bird Machine Co. King was formerly in charge of Bird's research and development center, while Shepherd was on the Midwestern sales staff.

G. R. Spellman has been named Midwest sales engineer for Albany Felt Co. He recently completed a three-year training course in all Albany Felt departments.

Jack D. Guthrie, formerly with the Woodlands Div. of St. Regis Paper Co. in Jacksonville, Fla., has joined the sales and service staff of Chemical Linings Inc. He is expected to make his headquarters in Atlanta.

John M. Krno, a vice president of Corn Products Sales Co., has been named manager of bulk sales development for Corn Products Refining Co. **David E. Linn**, assistant manager of the sales service department, becomes manager of sales service.

John R. Rogers, formerly assistant vice president of J. & J. Rogers Co. in Au Sable Forks, N. Y., has been appointed to the sales organization of Carthage Machine Co.

Milo Harrison Buzzee, sales manager for the plastics department of Jackson & Church Co. and an industrial designer and research engineer, has joined the staff of Tube Turns Plastics Inc. He will direct the marketing of custom-molded products and handle special assignments.

Richard Fiske Shaffer, former professor and chairman of the Chemical Engineering Department of Pratt Institute in Brooklyn, N. Y., has been named a chemical consultant for Gifford-Wood Co.

Edward E. Helm, vice president and general manager, has been elected president of Reliance Electric & Engineering Co. He succeeds **James W. Corey**, who has resigned to become board chairman.

Dr. Kurt C. Frisch, formerly manager of polymer research, has become director of application research for the research department of the Wyandotte Chemicals Div., Wyandotte Chemicals Corp.

Alfred D. Bonanno, a member of the technical sales staff, has been made manager of the Paper Div. of the Kelco Co.

Robert J. Jacobs, former manager of sales and engineering for the Dilts Div. of the Black-Clawson Co., has been named divisional general manager. He succeeds **Robert F. Vokes**, who has become administrative vice president in New York, N. Y.

Jack P. Greer has been named manager of the Mid-Central District of Hyster Co. He was formerly in retail sales at Chicago.

Henry A. Jacker has been named manager of foreign operations for the Roots-Connersville Blower Div. of Dresser Industries Inc. Jacker will assume responsibility for foreign sales representation and for the coordination of possible production facilities abroad.

Jerrold G. Hedin has been appointed sales representative for the Appleton Woolen Mills in the Great Lakes area. He is a former technical director of the Wabash, Ind. plant of Container Corp.

Howard J. Bowman has been appointed director of research and development for Trent Tube Co. of East Troy, Wis. Bowman came to Trent in 1943 and became chief industrial engineer in 1948.

Industrial Chemicals Div. of Olin Mathieson Chemical Corp. has announced realignment of sales management. They are: general products sales department managed by **Kenneth C. Frazier**; field sales activities under direction of **Derek Richardson**; a separate sales development department managed by **Laurence E. Russell** and an all divisional activities with **Cecil L. Williamson** as manager.

C. N. (Chuck) Frame, formerly a special representative for Oregon Chain, has been appointed manager of the Chain Saw Department in the Atkins Saw Div. of Borg-Warner Corp.

Seth M. Snyder, formerly of the Charlotte sales staff, has been named manager of the Charlotte, N. C. district sales office of the Boiler Div. of the Babcock & Wilcox Co.

Charles F. Dexter has joined the Boston office of Warren Steam Pump Co. as sales engineer. He was previously associated with Cochrane Steam Specialty Co.

A. Rollin Staley has announced his resignation as vice president of A. E. Staley Mfg. Co., Decatur, Ill. Staley, who has been in charge of

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customer relations since 1950 and vice president since 1954, said he is resigning in order to devote more time to personal business interests. He will continue as a member of the Staley board of directors, to which he was elected in 1941.

T. J. Clark has been appointed as northwest division manager of Atkins Saw Div., Borg-Warner Corp., Indianapolis. Clark has been with R. & J. Dick Co. Inc.

Robert E. Penney of Crane Co.'s branch and general office staff has been named director of branches. He fills the position made vacant by the death in a plane accident of **Jess A. McMurry.**

George I. Seybold has been elected a vice president of Rust Engineering Co. He had formerly served as vice president and assistant general manager of Chemical Construction Corp.

Frederick A. Gilbert has been appointed president of Becco Chemical Div. of Food Machinery & Chemical Corp. He succeeds Dr. Max E. Bretschger, who retired on the 30th anniversary of his association with the company.

Glenn E. Seidel has been appointed to the newly created corporate position of vice president in charge of engineering for Minneapolis-Honeywell Regulator Co. Seidel has been a member of Honeywell's extensive engineering organization for nearly 14 years and since 1952 has been vice president in charge of engineering in the firm's Minneapolis plants.

Hercules Filter Corp. announces the appointment of **John Erich Krost** as plant manager and **John Gaul** as purchasing agent.

Charles E. Hill, formerly assistant chief engineer of Pusey-Jones Corp., has been appointed chief engineer of Patton Mfg. Co. Inc.

Necrology . . .

Peter Jay Massey

Peter Jay Massey, inventor and consulting engineer in the paper converting industry and a former secretary and treasurer of the Superintendents Association, died in October at Rochester, Minn. He was 73.

Massey, whose home in later years was at River Forest, Ill., was a native of Jacksonville, Fla. A graduate of the Armour Institute of Technology at Chicago, he was for several years vice president for manufacturing of W. F. Hall Printing Co. He later held a similar position with Seaman Paper Co., also of Chicago.

In subsequent years he was associated with Combined Locks Paper Co., H. P. Smith Paper Co., Columbian Lithographing Co. and Midwest Wallpaper Co.

As an inventor, Massey obtained several patents, including the Massey coating process for magazine paper.

Clarence Birdseye

Clarence Birdseye, noted inventor and best known for the Birdseye frozen food process, died in October at his New York, N. Y. apartment. He was 69 years old.

Following the sale of his frozen food process to General Foods in 1929, Birdseye had devoted much of his time to the development and perfection of a continuous flow process for the preparation of pulp for paper manufacture from sugar cane bagasse.

He was president of Process Evaluation & Development Corp., a company formed in association with W. R. Grace & Co. and John W. Bolton & Sons Inc.

During 1953-1955 Birdseye made his home at a Grace sugar plantation in Peru, where the first commercially successful mill for the manufacture of paper from bagasse was placed in operation in 1939. The process has recently been made available through licensing to paper manufacturers throughout the world.

Louis Paul Fortier

Louis Paul Fortier, retired general superintendent for Simpson Paper Co. at Everett, Wash., and a veteran of more than 50 years in the paper industry, died recently at an Everett hospital.

Born in Orono, Maine, Fortier began his career in the industry at the age of 12, when he went to work at the Basin Mills of Orono Pulp & Paper Co. In 1912 he joined Eastern Corp. at South Brewer as assistant superintendent and moved in the same capacity in 1916 to American Writing Paper Corp. at Holyoke, Mass.

Following World War I Fortier became superintendent for Groveton Paper Co. and from 1924 to 1928 was superintendent at Bryant Paper Co. in Kalamazoo, Mich., following which he was named general superintendent for Michigan Paper Co. in Plainwell.

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His career with Simpson began in 1936, when he joined the predecessor firm, Everett Pulp & Paper Co., as superintendent.

Lester Nelson Hyatt, 79, board chairman of National Paper Co. of Atlanta, died recently. The firm's oldest employee in the point of service, he was named to the chairmanship two years ago.

Samuel A. Upham, former president and principal owner of Brownville Paper Co. in Brownville, N. Y., died in October at the age of 89. He was president of the firm from 1910 to 1946, at which time he disposed of his interest.

Eldon Parker Wilson, 63, a vice president of St. Lawrence Corp. Ltd., died recently in Montreal.

C. M. Sisson, president and general manager of MacSimBar Paper Co. in Ostego, Mich., died recently. He served as vice chairman of the advisory committee on paper technology at Western Michigan College.

Clifton R. Musser, 87, long associated with lumber and timber interests in the Northwest, died in October at his Muscatine, Iowa home. He was one of the original directors of Potlatch Lumber Co., established in 1903 at Potlatch, Idaho, and in 1919 became a director of Weyerhaeuser Timber Co. in Tacoma, Wash.

Peter T. Reuter, 58, manager of the Boston district office of Bailey Meter Co., died October 3. He had joined the firm in 1921.

George Everett Norton, 59, for the past 34 years manager of George Irish Paper Co. Inc. in Niagara Falls, N. Y., died in September.

William Henry Wolfe, vice president of Consolidated Paper & Box Mfg. Co. Inc. at Richmond, Va., died recently at a Richmond hospital. He had been with the firm 44 years and vice president since 1950.

Dr. Camille Edward Dreyfus, 77, board chairman of Celanese Corp. of America and a pioneer in the chemical and textile industries, died recently after a brief illness. Credited with the first successful commercial production of cellulose acetate and of acetate lacquer and plastic film, Dr. Dreyfus developed acetate yarn in 1914.

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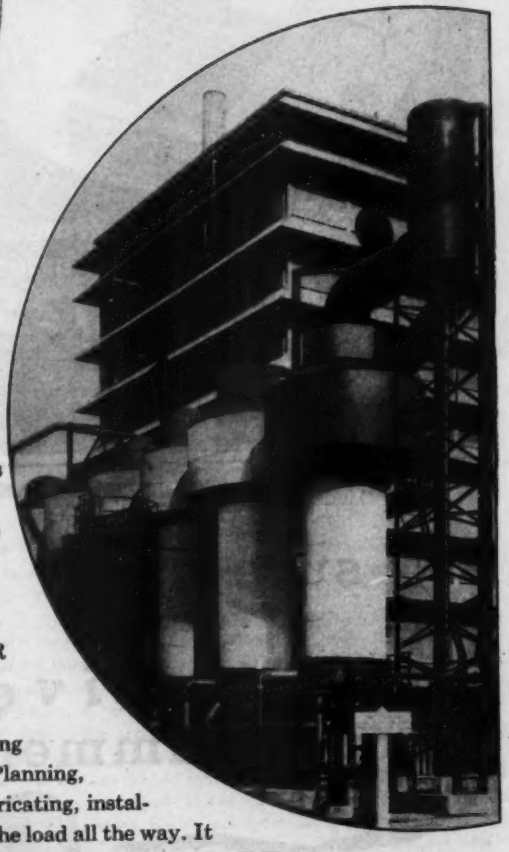

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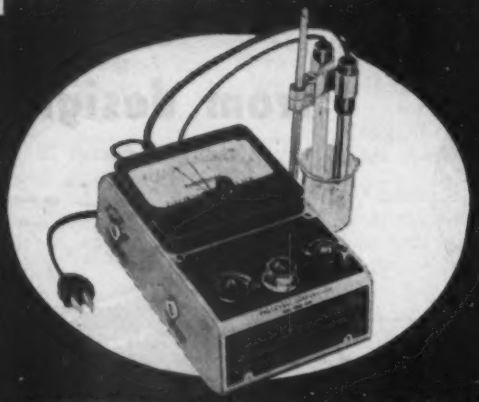

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PATENT REVIEWS

MELVIN NORD*

Separator-pumping operation for paper stock

U.S. 2,748,668, issued June 5, 1956 to Lloyd Hornbostel and assigned to Beloit Iron Works, describes a device for simultaneously pumping paper machine stock and centrifugally separating heavier impurities from it.

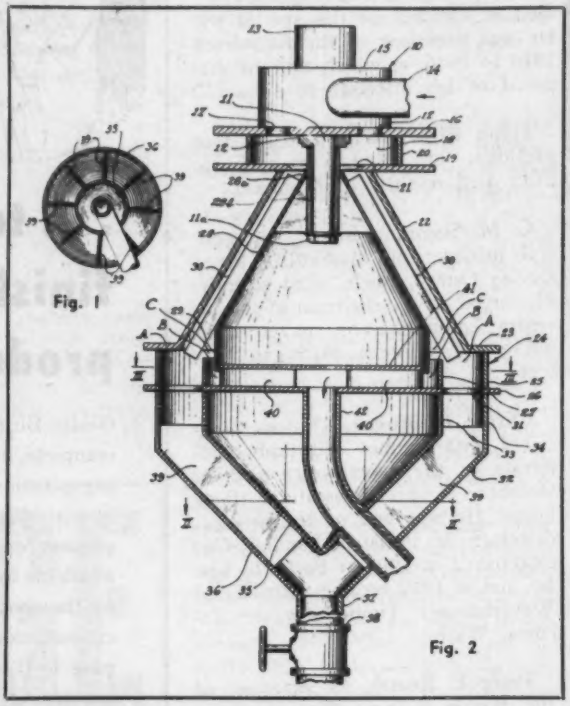

Fig. 1

Fig. 2

As shown in Figs. 1 and 2, stock enters pump 10 at inlet 14, and is discharged through apertures 17 into an inlet chamber 18 and then through an aperture 21, where it contacts blades 30 on a rotor 28 rotating at 350-1150 rpm. The heavier impurities are thus centrifuged out along the casing wall 22, while the stock is centrifugally pumped downward. The impurities slide freely into an annular chamber A. The turbulence is quieted by means of stationary vanes 39, and the impurities can be withdrawn from time to time from outlet 38.

The impurity-free fluid passes inwardly into chamber B through a series of curved stationary vanes 40 which help to divert the stock flowing in chamber B inwardly toward a discharge pipe 42.

Production of semi-chemical pulp

U.S. 2,749,241, issued June 5, 1956 to Paolo Marpillero, assigned to Development Tecnique de la Pate A Papier Anonyme Suisse, describes a process for producing semichemical pulp from a wide variety of raw materials, including soft woods which are not at present used in semichemical pulp processes. The process accomplishes a greater degree of delignification with a drastic reduction in the consumption of chemicals.

An acid sulfite bath containing less SO_2 than usual is used at a pH which is higher than usual, i.e. 2.5 to 5.0. The amount of SO_2 used is 60-100 kg. per ton of raw materials, instead of the normal 180-200 kg. In the conventional process, at least 120-130

*Patent attorney, 17600 Pinehurst, Detroit 21.

kg. of SO_3 are actually consumed. Thus, less SO_3 is used in the present process than would normally be regarded as the minimum theoretical amount required.

According to the inventor, the increased pH apparently orients the sulfonation and hydrolysis reactions in the direction of an increased reaction with lignin B in comparison with the reaction with hemicellulose C.

The process provides pulps which, due to their greater delignification, are superior in quality and much more easily defibrated than known sulfite pulps produced in similar yields.

In order to bring the pH to the desired value, an alkali such as CaO or MgO is added to the digester.

Solvent extraction of black liquor

U. S. 2,744,927, issued May 8, 1956, to James E. Copenhauer, William A. Biggs Jr., and William H. Baxley and assigned to Sonoco Products Co., describes a process for treating black liquor to remove constituents which are harmful to fish in streams.

The B.O.D. problem can be satisfactorily met, and valuable recovery of the organic acids and sugars in the black liquor obtained, by acidifying the black liquor and extracting with an ester-alcohol mixture such as 70 per cent isopropyl acetate and 30 per cent isopropanol. This treatment reduces the B.O.D. by about 50 per cent and recovers 95 per cent or more of the acetic and formic acids present in the black liquor. Recoveries of 10-20 per cent of the pentose and hexose sugars are also obtained. The higher the ratio of alcohol the higher the percentage removal of sugars.

Discharging pulp from bleaching towers

U. S. 2,745,274, issued May 15, 1956, to John P. Rich and assigned to Improved Machinery Inc., describes a means for removing pulp from the bottom of a bleaching tower in sequence with its rate of addition.

Hydraulic nozzles arranged around the periphery of the tower act in a manner similar to hydraulic mining jets. Each nozzle is controlled by a needle valve.

The valves are controlled independently of line pressure so that the water velocity, which contributes so greatly to the effectiveness of the jets as "hydraulic miners", is not decreased, though the quantity of water is adjusted according to the need. This is accomplished by feeding water to the nozzles by a centrifugal pump, whose characteristic is such that the more the flow rate is reduced, the higher the head produced, and therefore the velocity tends to remain approximately constant.

Recovery of vanillin from waste sulfite liquors

U. S. 2,745,796, issued May 15, 1956, to Otmar Toppel and assigned to Aschaffenburger Zellstoffwerke, describes a process for recovering pure vanillin from residues of extract solutions obtained from waste sulfite liquors.

The vanillin is separated from impurities by steam distillation in the presence of a mild oxidizing agent and a nonvolatile substance which is a good solvent for vanillin (e.g. polyethylene oxide). The use of the solvent prevents resinification of nonvolatile constitutents during the distillation. The mild oxidizing agent destroys volatile impurities which would otherwise distil over with the vanillin.

Generating steam by combustion of waste sulfite liquor

U.S. 2,747,552, issued May 29, 1956 to Gunnar Kyrklund, describes a method of producing steam directly from waste sulfite liquor, without the use of a separate steam boiler.

Concentrated sulfite liquor, high in dry matter, is burned in a combustion section of an evaporator assembly. The heat liberated is used to superheat steam. The superheated steam is then fed to the evaporator section, where it is used to evaporate water from the initial low concentration liquor. Part of the steam leaving the evaporator section is recycled to the combustion superheater section, and the remainder is available for use in the digestion or elsewhere. The concentrated liquor formed in the evaporator

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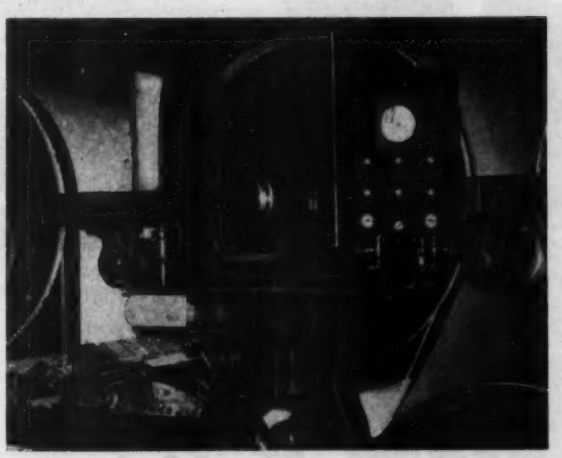

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section drops by gravity into a burner in the combustion section and is burned, thereby providing the heat necessary for superheating the steam recycled from the evaporator section.

Method for handling high-consistency paper pulp

U.S. 2,748,666, issued June 5, 1956 to Frank R. Forrest, assigned to Allis-Chalmers Mfg. Co., describes a method of handling high consistency pulp in the manufacturer of paper, e.g. up to 10 per cent solids. Advantages gained are greater fiber storage capacities for chests of given dimension, and ready transfer of high consistency stocks from the chests to the beaters and refiners, etc.

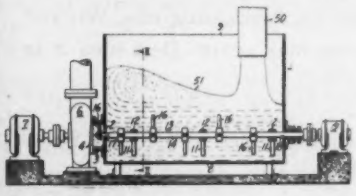


Fig. 3

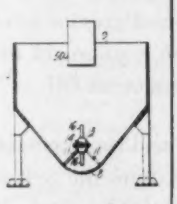


Fig. 4

As shown in Figs 3 and 4, a hopper or chest 1 is provided with a lateral discharge opening 2, which is connected to the suction inlet of a centrifugal stock pump 6. In the bottom of the hopper, bearing supports 11 provide a series of aligned journal bearings 12. An agitator 13, rotating in these bearings, is provided with axial flow turbine type propeller blades 16. The agitator is rotated by motor 19. As is seen in Fig. 1, a series of single bladed propellers is used for agitation. Each blade is statically and dynamically balanced by counterweights. Tip speeds of 75 feet per second are used.

The blades 16 of the agitator rotor are adjusted to have a helical pitch such that the action of the blades will tend to cause the material in the bottom of the hopper to be impelled in the direction of the opening 2. The entire body of pulp above the agitator will also be continuously agitated by the rotation of the agitator rotor. The nature of the turbulence produced is such as to maintain the body of pulp in a state of greatly improved flowability. There will thus be no bridging or clogging of the pump inlet, and no air binding.

Recovering sulfate ash from burning of black liquor

U.S. 2,749,212, issued June 5, 1956 to Alexander N. Crowder and assigned to Research Corp., describes apparatus for recovering sulfate ash from the furnace gases resulting from the burning of black liquor. The recovery is accomplished in an electric precipitator. The precipitated ash is transferred to and dissolved in a stream of black liquor which flows through the sump in a direction which is parallel to and concurrent with the flow of gases. The black liquor is thus progressively fortified as it flows concurrently with the gas stream, and the lightest fall of ash meets the most concentrated liquor which is able to dissolve the ash without difficulty.

Production of pulp

U.S. 2,749,240, issued June 5, 1956 to James H. Ross and assigned to Pulp & Paper Research Institute of Canada, describes a method for increasing the rapidity and uniformity with which wood chips may be penetrated by a cooking liquor.

The chips are first steamed at atmospheric pressure with the material vented to the air, in order to displace air. The material is then steamed at about 100 psig. Cooking liquor at about 90°C. is then charged at such a rate as to maintain the pressure constant. When all of the chips have been submerged in the liquor, it is permitted to remain in contact with the chips for about 10 min. Then the liquor is drained off, while steam is admitted in order to maintain a constant pressure of 100 psig. The cooking reaction is then finised in the absence of liquor other than that absorbed by the chips, e.g. for about 30 min. The cooked pulp is then removed from the digester, and is found to be substantially free of undercooked or overcooked portions.

Recovery of cooking liquor from spent semi-chemical pulping liquors

U.S. 2,750,290, issued June 12, 1956 to Eugene W. Schoeffel and assigned to Sterling Drugs Inc., describes a method for the economic reclamation of sodium sulfite cooking liquor from spent semichemical pulp liquor.

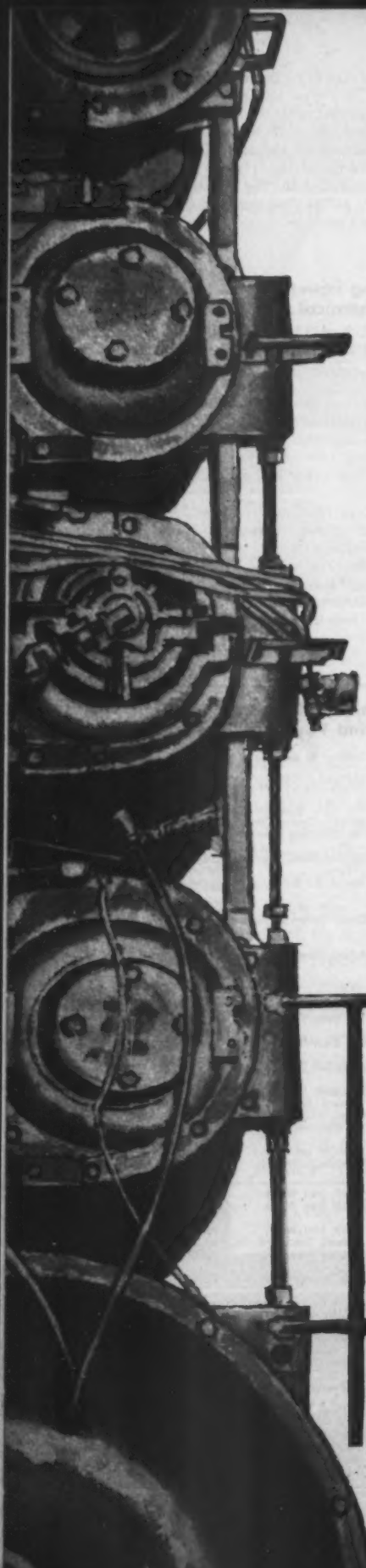
The liquor is oxidized completely by means of compressed air in a liquid-phase flame oxidation. The liquor is charged to a reactor tower at 800 psi. and heated to 235°C. Compressed air is introduced to initiate the reaction. The reaction is then self-sustaining, and air and liquor may be continually admitted to the tower.

The liquid effluent from this tower contains all the sulfur as Na_2SO_4, along with other sodium compounds such as Na_2CO_3.

Sulfur dioxide and calcium carbonate then convert the sodium sulfate to sodium bisulfite. The calcium sulfate precipitate is removed, and the filtrate is treated with calcium oxide, forming sodium sulfite which is returned to the pulping process. The calcium sulfite formed is recycled along with additional effluent from the reactor tower.

Other Patents of Interest to the Pulp and Paper Industry

Subject	Inventor or Assignee	Patent No.	Date
Apparatus for assembling cartons	Robert Gair Co. Inc.	2,746,362	5/22/56
Carrier cartons	The Ohio Boxboard Co.	2,746,638	"
Carrier for bottles	Atlantic Carton Corp.	2,746,639	"
Fiberboard protective structure for television sets	The Baltimore Paper Box Co.	2,746,666	"
Shipping container with cushioning liner	Custom Made Container Corp.	2,746,667	"
Merchandise case having a detachable moisture proof bottom tray	Harold A. Ringel et al	2,746,668	"
Citrus fruit packaging paper and method of mould control therefor	Crown Zellerbach Corp.	2,746,872	"
Adhesive paper sheet or tape	August Wegener	2,746,881	"
Molded pulp slipper	The Diamond Match Co.	2,747,301	5/29/56
Fissuring wet felted fiber board	The Celotex Corp.	2,747,470	"
Head box for paper making machines	The Black-Clawson Co.	2,747,471	"
Feeding and erecting mechanism for carton blanks	Ex-Cell-O Corp.	2,747,473	"
Cartons	The New Haven Pulp & Board Co.	2,747,785	"
Collapsible container	Morris Paper Mills	2,747,786	"
Combined packaging and supporting members	The American Rondo Corp.	2,747,787	"
Method of pulp production	Rayonier Inc.	2,747,995	"
Tub sizing of photographic paper	Eastman Kodak Co.	2,748,029	"
Paper machine head box	Beloit Iron Works	2,748,669	6/ 5/56
Paper machine cross-flow stock distributor	Beloit Iron Works	2,748,670	"
Paper-making machines	Beloit Iron Works	2,748,671	"
Apparatus or molding pulp	Formart Containers Inc.	2,748,672	"
Device for setting-up collapsible cellular cartons	Bloomer Bros. Co.	2,748,674	"
An arrangement for impregnating paper containers	Fritz Wommelsdorf	2,748,746	"
Collapsible display cartons	William B. Crane Jr.	2,748,927	"
Paperboard doll container	Joseph J. Stavis and Bernard H. Stavis	2,748,928	"
Truncated conical paper cup	Lily-Tulip Cup Corp.	2,749,010	"
Ventilated compartment box	National Container Corp.	2,749,011	"
Furniture saddle support	Guardian Container Co.	2,749,012	"
Internal support for packing boxes	International Paper Co.	2,749,013	"
Cellular containers	Waldorf Paper Products Co.	2,749,014	"
Folding cartons	Container Corp. of America	2,749,015	"
Re-usable collapsible carton	Onil O. Cote	2,749,016	"
Cartons	Cooper Carton Corp.	2,749,017	"



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FOREIGN ABSTRACTS

Vortex type cleaners

The author discusses the fundamental principles involved in the construction of vortex type cleaners, and how these conform in shape and in size with the theory of a free vortex.

Different cleaners should be used in removing various types of dirt, and diagrams illustrate the most effective combination of centrifugal screens and vortex type cleaners. Type "600" of vortex cleaners is shown in Figure 1.

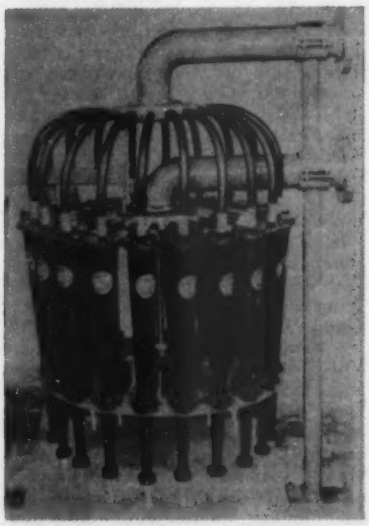

Fig. 1

The need for installing cleaners in pulp mills is discussed, and certain installations are described, that will remove air and dirt simultaneously from papermachine furnish.

Twelve figures and 8 references are given. Ragnar Eie. *Norsk Skogind.* 10, No. 7, 247-53 (1956) (Original in Norwegian with brief English summary).

Rapid method for the determination of cellulose

The author claims that a new technique under carefully standardized conditions will yield "pure" cellulose quantitatively and within a very short time period.

Wood meal was screened through wire (with 200-250 meshes per sq. inch), extracted with alcohol-benzene, and air-dried. One gram samples were then heated for one half hour in a boiling water bath with a mixture of 6 cc. acetylacetone, 2 cc. dioxane, and 1.5 cc. hydrochloric acid (d.1.19). A fifty cc. round bottom flask was used as container, and the level of the liquid in the flask was above the water level of the bath. At the end of the heating period, the suspension was filtered immediately using a fritted glass crucible, and the fibrous residue was stirred with methanol, and washing successively with methanol, dioxane, hot water, methanol and ether.

Suction was applied after each solvent application. The crucible and the white fibrous residue was then dried to constant weight at 105 deg. C. The operation, prior to drying, usually required only one hour. A raw cotton containing 90.22 per cent alpha-cellulose as determined by the usual standard technique, gave 89.3% cellulose by the new procedure.

In the case of wood samples, the "pure" cellulose was apparently free from lignin, but under some conditions it still retained mannose units and pentosans. However, the yields by the new method were invariably lower than those from the same wood samples analyzed for cellulose by the Kürschner-Hoffer method, and the "cellulose" residues isolated by the latter were always higher in non-cellulosic materials. The results are discussed at length, and orienting experiments are described in detail. Data are given for pine, spruce, red beech and a poplar.

Thirty-three references, 4 figures and 9 tables are given. Karl Seifert. *Das Papier* 10, 301-6 (1956) (in German).

Recording surface temperatures of drying cylinders

In studying some of the classical problems dealing with the drying of paper, the author used some of the small, newly developed electrical thermometers made by Svenska Matapparatur F.A.B. in Stockholm. Three of these thermometers are described briefly and two of them are illustrated by diagrams. They serve to record the temperatures on the surfaces of rotating drying cylinders during full operation —an accomplishment which the author claims had not been hitherto possible.

By use of these instruments, it was also possible to follow relatively slight temperature changes and to formulate a continuous control of surface temperatures. At other points of the paper machine, these same instruments served to determine such temperatures as those of steam, condensates, heated air, stock, etc.

It was shown that heat transfer from the drying cylinder occurred periodically, and that there were greater decreases in the temperatures of the cylinder wall than others had assumed. When the paper reached the cylinder, the temperature dropped, and (usually) a further substantial drop occurred when the felt reached the cylinder. When the felt left the cylinder, the temperature rose, and this rise was increased when the paper left the cylinder. Some of the graphs show surface tmeperature variations caused by papers of varying moisture content. Thirteen cuts are included.

Axel Th. Carlander. *Das Papier* 10, 413-19 (1956) (in German with brief English and French summaries).

Improvements in groundwood pulping in Sweden

In connection with the building of a new groundwood mill and of rebuilding an old mill at Kvarnsveden, a series of improvements were made which are fully described.

Automatic feeding of wood to the grinders was installed, and modern chain grinders replaced the pocket grinders. In this way the capacity of each worker was increased from the earlier 3.3 cords per shift to 41 cords. Advantages were also gained by high temperature in the grinder pits and by brushing the pulp stones with rotating steel brushes.

These changes resulted immediately in mechanical pulp of greatly improved quality and in increased paper production. The sulfite content was also greatly reduced. It was shown further that the quality of the sulfite pulp to be added was less important than was the high quality of the groundwood. The power regulator at the grinders with the new ASEA torductor regulator is described; evidently it has given good results. This is the first time that this regulator has been introduced on a large industrial scale. In treating the rejects from coarse screenings, a refiner of the type shown in Figure 2 is used. This consists

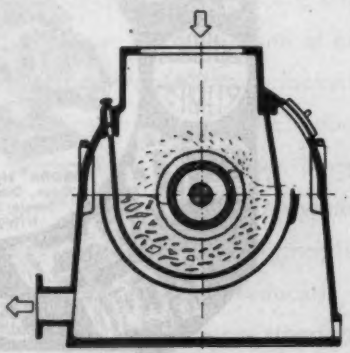

Fig. 2

of a rotor, a shell and a screen plate enclosed in a suitable casing, the lower part of which consists of a vat with an outlet. This refiner, developed at the mill, could also be used successfully for handling

other lignified materials such as sufite knots, semichemical pulps and even sawmill wastes.

The data are fully tabulated, and the equipment well illustrated by adequate halftones, simple sketches, and suitable graphs. Twenty-four figures and 3 tables are included.

Bengt Soderberg. *Svensk Papperstidning* 59, 412-420 (1956) (in English.)

Dispersing agents used in controlling pitch

This is a contribution from the laboratories of Zellstoff-Fabrik Waldhof.

In the determining the amounts of troublesome pitch, and in gaging its control by the use of commercial dispersing agents, three laboratory methods were applied. One of these was a procedure in which purified air was passed into a pulp suspension of low consistency, whereby the pitch was separated by flotation. Another method was that of Gustafsson in which pitch separated on a mechanical stirrer and on the walls of the vessel containing the pulp, followed by pitch extraction with methylene chloride. A third procedure was termed a "vibrator method". In this, two excentrically placed discs were mounted on a rod and the pitch was deposited on them by means of a rapid stirrer. In this last-named method the discs were removable, and were weighed at the start and then at the end of the determination.

In spite of the general applicability of all three methods, and although each method taken separately gave good reproducible results under carefully controlled conditions, the data obtained by a given method were often quite different from those found with one of the other methods. Results were also contingent on the type of pulp used, the quality of the water, on the effectiveness of pulp sampling, etc.

The authors used all three methods in determining whether or not they should consider a given dispersing agent suitable in cutting down pitch deposition, and in evaluating the agent. Details of these experiments are given and tabulated. In the case of six commercial dispersing agents, all three methods showed that pitch deposition was greatly decreased, so these agents were rated as "very good". In four cases, the investigators were left in doubt, because the results obtained with one procedure gave results inconsistent with those of another. In two instance the reagents were consistently poor, and the dispersing agents were ineffective. U. Strole and D. Teves. *Das Papier* 10, 264-70 (1956) (in German).

Paper and board used in packaging

In an illustrated lecture, the author shows some of the recent more scientific approaches to what, up to the present, have been largely empirical tests. He discusses the stresses to which wrapping materials are subjected during processing, transportation and storage.

The strength and cushioning effects obtainable with solid and corrugated fiberboard containers, the adhesion process, and the water-vaporproofing of packaging materials are outlined. Rudolf Heiss. *Das Papier* 10,37-41 (1956) (in German).

Alkaline hydrolysis of glycosidic linkages

As a result of the present experiments and of previous data, the author interprets the degradation of polysaccharides during alkaline digestions. Although the glycosidic linkage is generally considered stable to alkali several types of alkali-liable glycosides are known and this area has been summarized by Ballou (Cf. *Advances in Carbohydrate Chemistry* 9, p. 59 (1954)).

Experiments were carried out by the present author with such model substances as cellobitol, lactitol, maltitol, and various alkyl glucosides, galactosides, and xylosides. All of these suffered some decomposition when heated with 10 per cent caustic soda at 170° C for several hours. The alpha—configuration was shown to be more stable than the beta-configuration. Evidently glycolytic linkages are split by means of alkali and the rate of degradation in general is higher with the beta-glycosides.

In alkaline pulping the degradation appears to start the reducing end groups (and any other carbonyl groups formed by oxidation of the polymeric carbohydrates). This proceeds as a form of "peeling reaction", and new end groups are formed and attacked. Since levoglucosan is less stable than are the ordinary glycosides, the potential formation of 1, 6-anhydrides in this reaction will not stabilize the hydrolysis products and the peeling reaction continues. Even though a small percentage of the glycosidic bonds are ruptured initially, polysaccharide decomposition may be quite marked because each cleavage inaugurates a new fission. However, when the end (potential) aldehyde group is oxidized to carboxyl, by some oxidant not acconuted for by the author, the peeling action ceases.

Four references. Bengt Lindberg. *Svensk Papperstidn.* 59, 531-4 (1956) (in English).

Viscosities of sulfite dissolving pulps

This is a fairly extensive contribution from the laboratories of the Norwegian Pulp and Paper Institute, and involves a comparative study of viscosities taken in cuprammonium hydroxide (Cuam) and of the corresponding nitrates in acetone.

A series of spruce sulfite dissolving pulps were examined. The degrees of polymerization (D.P.) in the two solvents were also determined. The average value for the ratio (Nitrate viscosity) to (Cuam viscosity) was 2.63, which is in good agreement with that found by other investigators, some of whom examined a much greater variety of pulps. The correspond-

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ing D.P. ratio for the original pulps along with D.P. (nitrate) to D.P. (Cuam), was 1.43. Similar comparisons were also made after the pulps had been mercerized, when the corresponding D.P. ratio was 1.09. Samples that were regenerated after ageing, gave D.P. ratios approaching unity (0.99). The conclusion is reached that when the original sulfite dissolving pulps were dissolved in Cuam, their average percentage degradation was 25 per cent. There appears to be a possible correspondence between copper numbers of these pulps and the degrading effects noticed when these pulps are mercerized. However this hypothesis is made with due care because of the paucity of data and somewhat scattered results.

Three tables and 24 references are given. O. Ellefsen and F. A. Abadie-Maumert. *Norsk Skogind.* 10, No. 7, 238-44 (1956) (In English, with French summary).

Influence of wire mesh on the drainage rate of pulp

This work was carried out at the Technische Hochschule at Darmstadt. Four immobile screens were used, each of which had different mesh dimensions, and two screens were used in each comparative study.

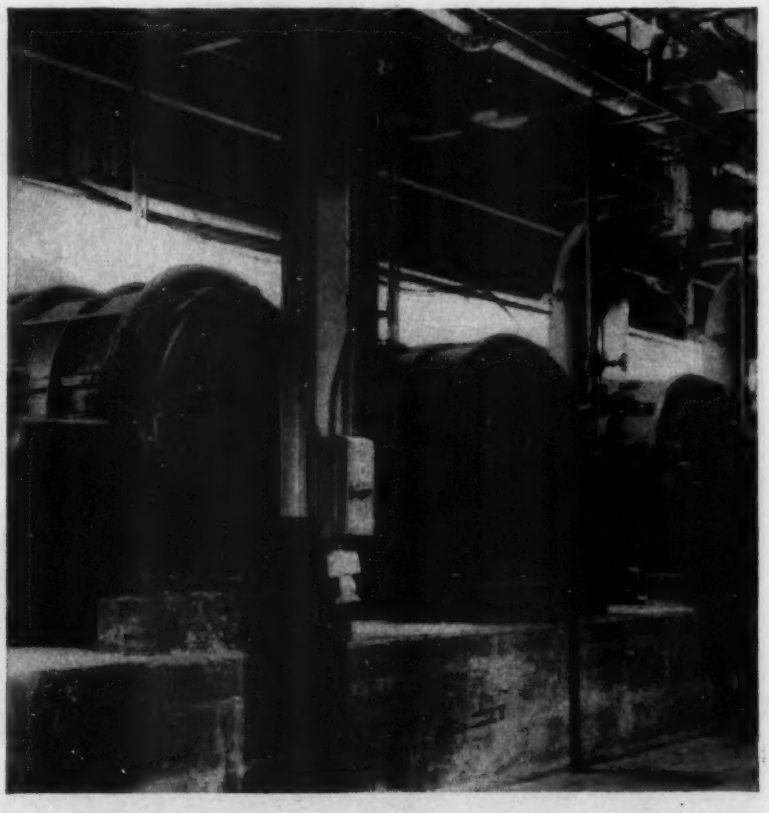
The flow rate of pure water was determined for the two screens and the *difference* in rates was recorded. These same screens were then also used in determining the drainage rates from wet pulp sheets, and the difference in drainage times were noted. An unbleached spruce sulfite pulp was used throughout these experiments, under a constant head of water and draining at 12.5° C.

The authors define as the so-called "critical basis weight" of a wet sheet (calculated on the dry basis) that basis weight in grams per square meter, which reduces the *difference* in water flow to *one tenth that of the initial difference* (found for pure water on these same screens free from pulp). In the case of the spruce pulp, this critical basis weight was 14 grams per square meter.

The differences in screen mesh had a greater effect on the drainage rates of paper with low basis weights than in the case of heavier sheets. However even with those having basis weights higher than the critical basis weight, water drainage differences on the various screens were significant because the critical basis weight is reached more rapidly when a screen of relatively coarser mesh is used. The greater the difference between the final basis weight of a paper and its critical basis weight, the less is the influence of the screen type on the dainage. Apparently the critical basis weight of a well beaten stock is lower than that of a raw stock. Thus the differences in drainage on screens of various meshes are more significant in the formation of thin sheets from free than those from slow stock. Inasmuch as this study was limited to one pulp type and to 4 screens it is considered orienting in nature.

Seven graphs and 6 references are included. Walter Brecht, Horst Erfurt, and Wilhelm Volk. *Das Papier* 10, 395-402 (1956) (in German, with English and French summaries).

What, actually, do Vacuum Pumps on paper machines handle?



Paper mill engineers know that it is actually a mixture of air and water vapor, but the custom of rating vacuum pumps in terms of air capacity alone causes this important fact to be frequently overlooked.

The presence of this water vapor causes a considerable reduction of the effective air handling capacity of any vacuum pump except the Nash. In the Nash Vacuum Pump the bulk of this water vapor is effectively condensed, due to the Nash operating principle. The air handling capacity of the Nash is therefore not reduced.

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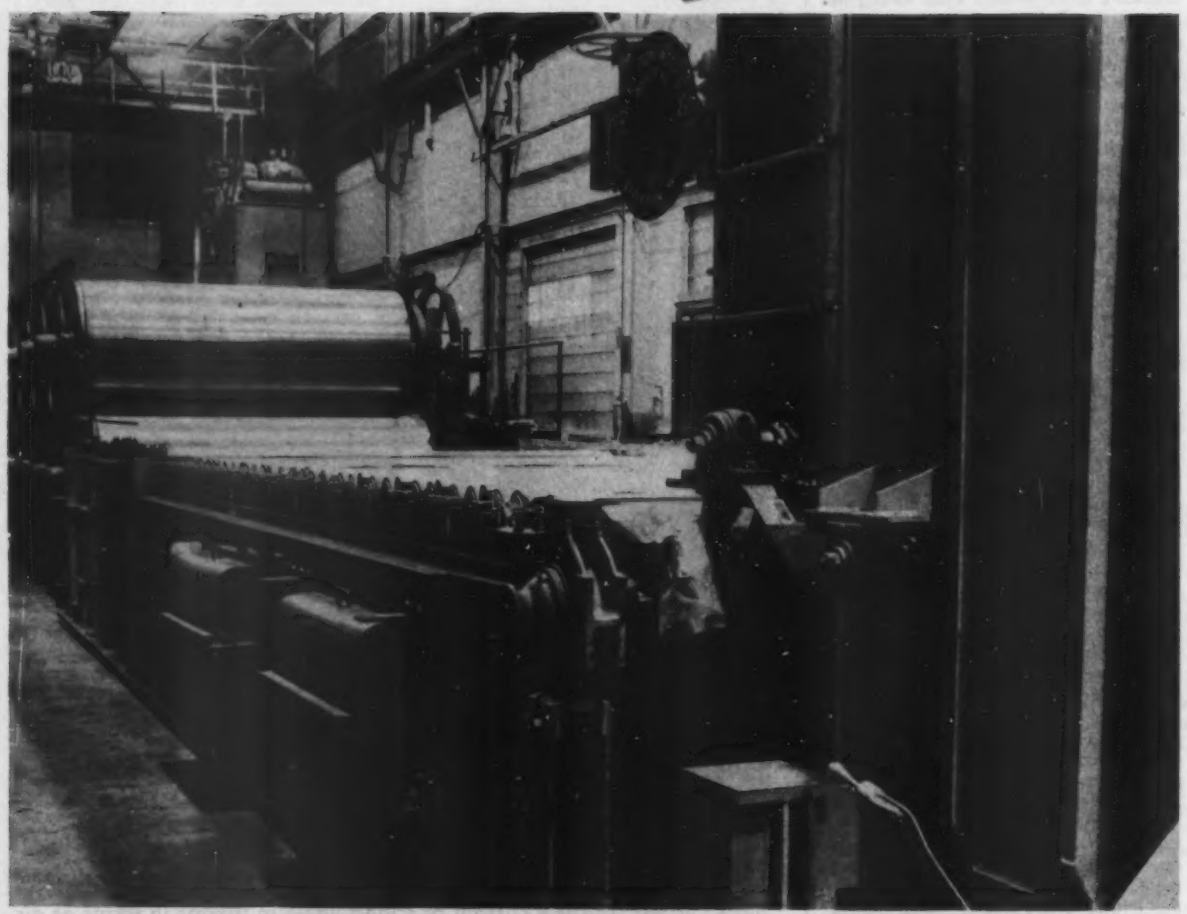

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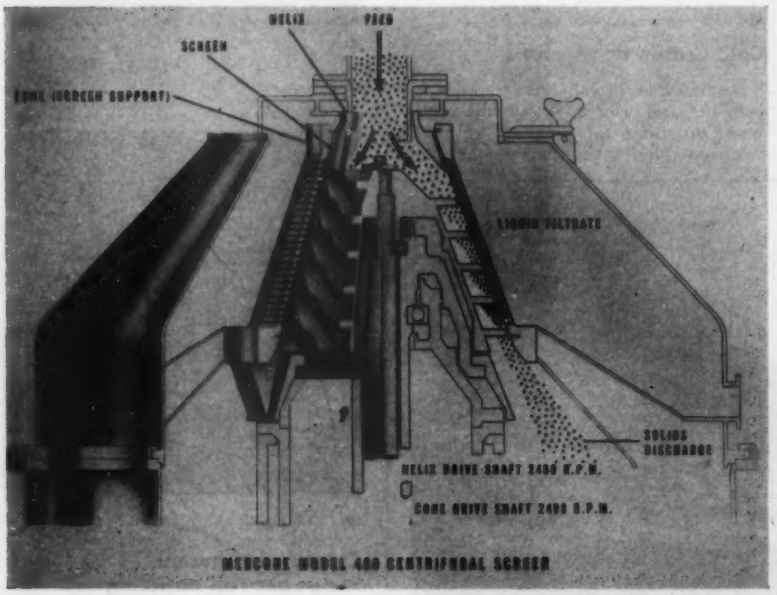


MERCONE MODEL 400 CENTRIFUGAL SCREEN

These items are numbered for your convenience. Further information on the various products described may be requested at no obligation through our Readers' Service Dept. Use the business reply card in this issue.

11/ Use readers' service card.

Mercone screening centrifuge

The diagram above, gives a cutway view of the Mercone screening centrifuge, a new continuous centrifugal separator which combines the outstanding features of both centrifuge and screen.

This unit is designed to dewater, classify, produce a dry cake, or accomplish two or more of these functions simultaneously and continuously.

The manufacturer has stated that the unit operates faster and at a lower cost than any other method now in use.

In operation, feed slurry is introduced through the top of the unit by gravity and falls against the inner surface of the revolving screen. Centrifugal force, forces liquid through the holes in the screen. Solids are gently conveyed down the sloping screen surface by the spiral helix which rotates at 60 rpm faster than the closing screen.

The separator is already finding application in the dewatering of pulps and the washing and drying of fibrous and granular solids. *Dorr-Oliver Inc.*

12/ Use readers' service card.

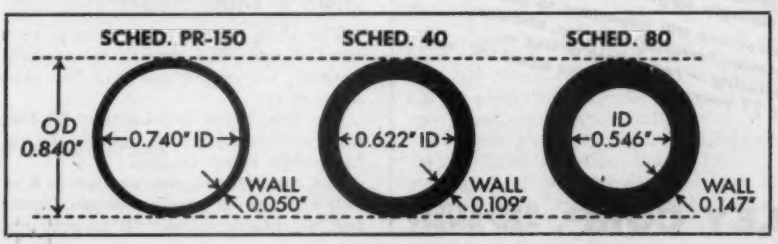
Polyvinyl chloride pipe

A new line of light-wall polyvinyl chloride pipe with a uniform pressure rating in all sizes has been introduced.

This series represents an addition to the firm's recently announced Schedule 40 and Schedule 80 pipe. Its generally thinner wall and larger inside diameter give it greater flow capacity than Schedule 40 and 80 in the same nominal pipe sizes.

Three end views of ½ in. PVC pipe are shown below comparing the wall thickness and flow capacity of the three schedules.

There are two basic types in this new series. One has high chemical resistance and a maximum working pressure of 150 psi at 75° F. The other has high impact strength and a rating of 125 psi at the same temperature. These two working pressures are constant in all pipe sizes. *Carpenter Steel Co.*



13/ Use readers' service card.

Pressure and temperature controls

The A. W. Cash Co has added two new types of pressure and temperature recording controller and recorders to their line.

Type 57 pneumatic recording controller, controls and records both pressure and temperature. This model has either 9 in. or 12 in. spring or electric driven charts and on-off, duplex on-off or 1-100 per cent proportional action. Pressure ranges are from 0-5 to 0-5000 psi (0-25,000 psi for 12 in. single pen only) and temperature range is from 350° F. to 1200° F.

Type 58 recorder records pressure and temperature in the same ranges as Type 57. Type 58 recorder comes with either 6 in., 9 in. and 12 in. charts. They are also spring or electric driven, and have from one to four recording pens. *A. W. Cash Co.*

14/ Use readers' service card.

All-electric log loader

The photo above, shows the new all-electric log loader manufactured by R. G. LeTourneau.

This model, which is currently being job-tested has proved its many features such as: an arrangement of powered outriggers, controlled by a simple switch within the

cab—this arrangement promises to save much time formerly required for setting up and leaving a job; a DC-powered hoist and swing design which provides exact speed and power with infinitely controlled "spotting" action; and heavy capacity for the woods. *R. G. LeTourneau Inc.*

15/ Use readers' service card.

Pulp classifier

A newly-designed unit has been manufactured for classifying pulp fibers. From the coarsest stocks used for wall board, to the shortest paper making pulps, this unit can classify four general lengths in four minutes.

Users of the pulp classifier have said it never clogs, even with screen of 250 mesh, and have praised its streamlined construction and clean operation. *Thwing-Albert Instrument Co.*

16/ Use readers' service card.

Cold water deaerators

The Cochrane cold water deaerator has been designed with many outstanding features to reduce or eliminate corrosion. Some of the features are: Complete deaeration without heating or cooling; tremendous spilling edge for maximum deaerating efficiency; and multiple stage units permitting economical deaeration down to a fraction of a part per million.

"Down time" for repairs or replacement of corroded equipment and other corrosion problems, which are so costly, can be alternated by the use of water deaerators.

Cochrane cold water deaerators are "tailor made" with performance arrangements, vacuum producing equipment, and materials best suited to individual requirements. *Cochrane Corp.*

The "baby" of these three giant looms weaves a 240-inch width fourdrinier wire; the largest, a 292-inch wire.

This latest battery of looms — part of our continuing modernization program, — was added to serve the demand for increasingly large wires.

However, much smaller wires are still important to the greater part of the paper manufacturing industry, and our efforts are directed to producing — regardless of size — the very finest wires our 79 years of experience allow us.

EASTWOOD-NEALLEY CORP. BELLEVILLE NEW JERSEY

17/ Use readers' service card.

Clamp attachment for paper roll handling

A specially designed paper roll clamp attached to a lift truck, has proven speed in the movement of heavy paper rolls.

The Automatic Transportation Co., of Chicago, has designed this attachment for a lift truck now used by a paper company. The company has stated that this unit has shown considerable savings for the company. *Automatic Transportation Co.*

18/ Use readers' service card.

Chain wrench

This chain wrench has proven to be a versatile tool. The wrench is especially designed for rugged use and for close corner work.

The wrench jaw is constructed so that, when in use, the greater the force on the handle—the tighter the grip.

The chain will fit pipe sizes up to 6 in. and will also fit round, hexagon, square and all irregular shapes. It is also used

very effectively for holding or turning operations. *Toledo Pipe Threading Machine Co.*

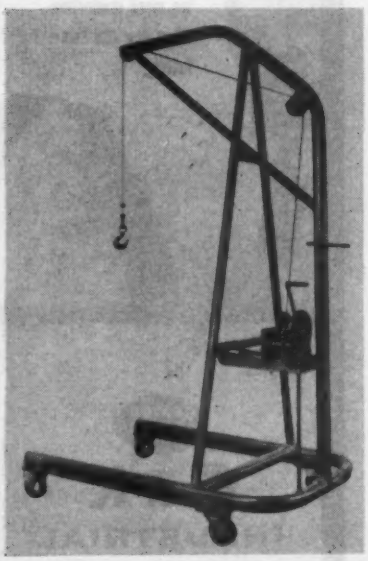
19/ Use readers' service card.

A new tool for lifting, lowering and pulling

This new tool, with its multiple uses, could be considered a must in the paper mill industry—from the woods to the finished paper rolls.

Known as the Multi-Pul, this tool was created to do heavy-duty lifting, lowering and pulling with maximum performance.

A few of the many uses in the industry are: In pulpwood—for binding cords on trucks and railway cars; In piping—the replacement of piping around the mill can be made easier; In maintenance—countless uses can be found here in the handling heavy machinery and equipment around the mill; In the finished product—a great help in binding rolls on trucks or in railroad cars. *Multiple Corp.*



20/ Use readers' service card.

Portable crane

A new all-purpose portable crane, shown above, has been built for general duty around the plant. Weighing only 350 lbs., the crane will carry a 3000 lb. load on a single line with only one man at the crank.

Regardless where the operator stops turning, the load is held safely and securely in that position.

This portable crane can be found very useful in many jobs in the mill such as: loading, unloading, lifting and many other materials handling operations. *Sasgen Derrick Co.*

21/ Use readers' service card.

Swivel nozzle for bulk loading

The swivel nozzle, pictured above, was basically designed for loading bulk material into bulk containers.

This nozzle consists of a bent aluminum tube approximately 2 ft. long and 3 in. in diameter. It is fitted into the center of a standard or custom-designed aluminum hatch cover.

Equipped with a rubber gasket, the hatch cover, when fitted to the hatch, provides an air-tight seal, preventing the escape of bulk material being loaded into the transport unit. *Fuller Co.*

22/ Use readers' service card.

Speed reel for continuous surface winding

Dilts Division of Black-Clawson announces its Model SS uniform speed reel. This reel is designed to suit paper and board where continuous operation without stops for roll changes is desired at the winder.

The reel features: 72 in. maximum web width, 48 in. maximum roll diameter, speeds up to 600 fpm, and permits new roll starts at full operating speed. *The Black-Clawson Co.*

23/ Use readers' service card.

Flow rate indicator

A new inexpensive flow rate indicator has been developed for use with turbine-type primary metering elements.

The unit, known as the Industrial Logarithmic Panel Indicator, converts the output signal of the turbine meter into a series of pulses of constant amplitude at a frequency equal to that of the turbine meter

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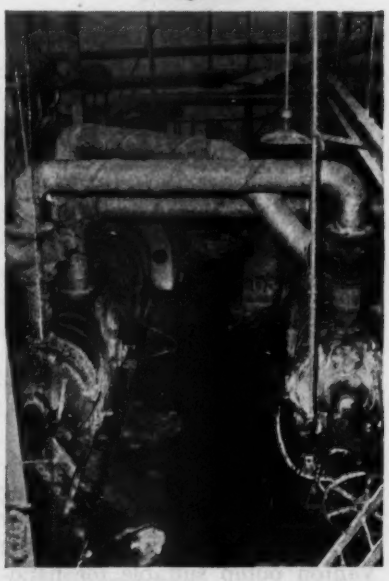

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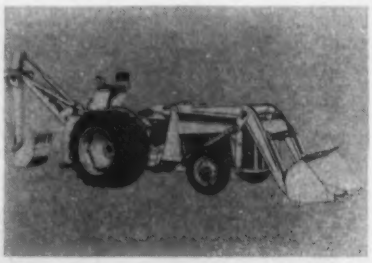
output and, therefore, proportional to volumetric flow rate. *Fischer & Porter Co.*



24/ Use readers' service card.

Mobile crane

A newly designed mobile crane, KE Karry Krane, is equipped with power steering and enables the unit to maneuver easily and quickly in crowded storage areas. For reaching into road trucks and box cars, the KE features several optional boom lengths adjustable to six positions. Hydraulic power topping for even greater versatility is optionally available for raising and lowering the boom. A recessed bumper well permits handling of larger loads. *Hyster Co.*

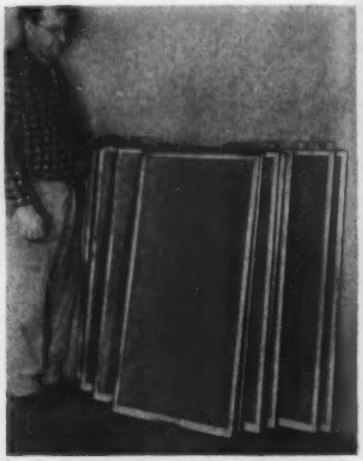
25/ Use readers' service card.

Meter to determine tension of felts on the paper machine

The Huyck-Meter, is a new instrument which is used in determining the absolute tension of running felts on the paper machine.

This meter was developed and is used by the F. C. Huyck & Sons' field service engineers to solve a problem that has long troubled papermakers — determination of the degree of tension which permits proper openness, maximum water removal and longer felt life.

Prior to the development of the Huyck-Meter, the traditional, none-too-accurate method for evaluating tension in a felt running on a paper machine consisted of simply feeling it with thumb and finger. The meter has eliminated this method. *F. C. Huyck & Sons.*



26/ Use readers' service card.

Filter leaf

A new-type filter leaf, known as "Rim-Lok", has been designed to overcome the disadvantages of the conventional type leaf.

The new "Rim-Lok" leaf is constructed to hold the filter cloth in a heavy-gage sheet metal frame. This prevents sagging

"You'll get top power for more production when you use this belting."
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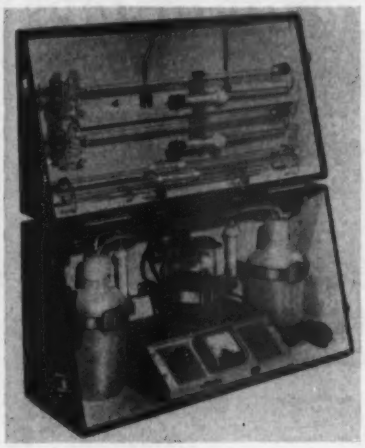
— an advantage over other types. Another advantage is the corner design, this permits increased filtering area.

To add as another feature, the "Rim-Lok" filter leaf is lower in cost than other types. *White-Metal Wire Cloth Co., Inc.*



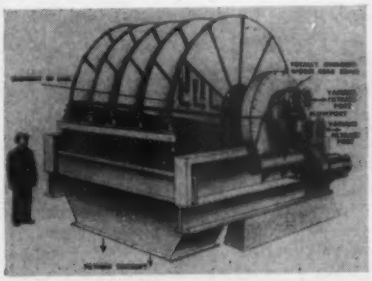
27/ Use readers' service card.

Portable moisture determinator

A new, portable moisture determinator, for use in field stations, laboratories, or quality control points, is now on the market.

This unit, called the Cenco Karl Fisher moisture determinator, is completely self-contained and can analyze liquid, solid and gaseous samples without removing the basic apparatus from the case.

It is recommended for moisture determinations on waxes, paper and a wide variety of other materials. The unit can be operated any place where 115 volt, 60 cycle current is available. *Central Scientific Co.*



28/ Use readers' service card.

Disc filter

The Denver Co. has just introduced a new 9' diameter disc filter having 105 sq. ft. in the filter area per disc. There are 12 segments per disc instead of the usual 10.

Patented filter segment design provides gravity drainage prior to discharge and results in drier filter cake.

Flexible bellows-type hose is provided, thus preventing any tension on the valve cover which will allow the valve to seat tightly at all times. *Denver Equipment Co.*

29/ Use readers' service card.

X-ray beam for measuring paper thickness

A new-type gauge, employing an X-ray beam, has been manufactured for measuring and controlling the thickness of paper sheet without touching the material in process.

The X-ray beam's energy is transmitted through the material being measured. This energy is collected by a receiving unit and converted into electrical impulses which in turn actuate the electronic equipment in a main console.

From the main console equipment, it is possible to actuate a large scale zero centered meter, a continuous chart recorder or a device for actuating sheet rollers which automatically controls the thickness of material being processed. *Industrial Gauges.*

30/ Use readers' service card.

Foam killer for acid stocks

A paste-type defoamer, known as De-Airex 530, has been developed for the paper mills in use with acid stocks. The

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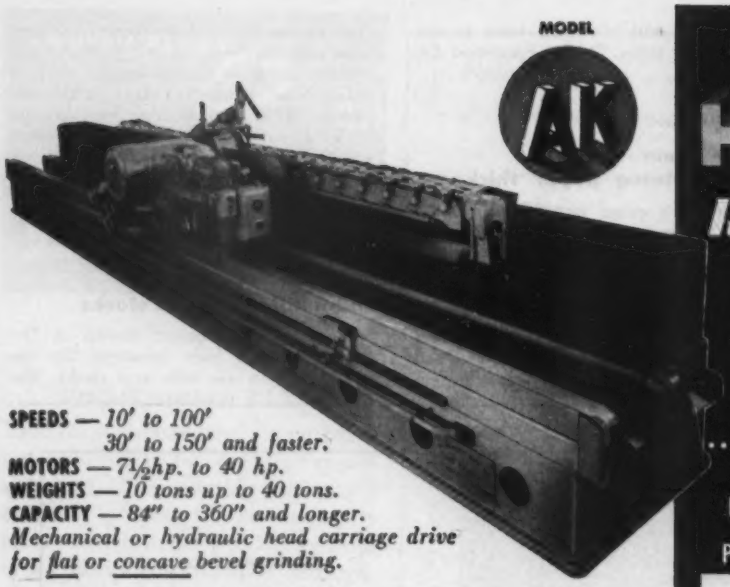

MODEL AK

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SPEEDS — *10' to 100'*
30' to 150' and faster.
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Johnson Joint
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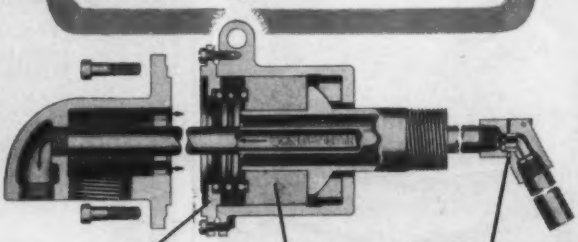
with SYPHON ELBOW



ASSEMBLY PLATE — Holds internal parts in position when head is removed.

SELF-SUPPORTING — Needs no external supports of any kind.

SYPHON ELBOW — Permits use of straight pipe for syphon. Can be inserted or withdrawn right through the joint.

WRITE FOR INFORMATION

Bulletin S-2001 has all the facts on this joint-and-elbow combination that supports itself, has no packing, needs no lubrication, outmodes unwieldy syphon pipes. Johnson Joints are also available in pipe-supported and rod-supported types, to suit all operating needs.

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New Products . . .

defoamer has been noted to improve production of fine grade writing papers, bonds, coating stock, glassine, and printing stock. It is also recommended for use in sulphite mills to improve the screening process.

De-Airex 530 is not affected by freezing and mixes readily with water. *E. F. Houghton & Co.*

31/ Use readers' service card.

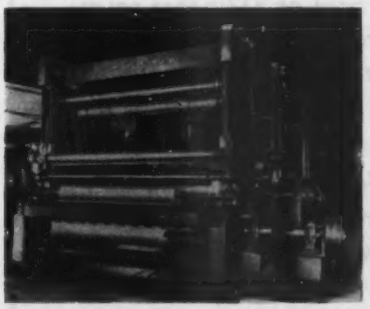
Dump truck for use inside of plant

This truck could be found useful in many operations around the mill.

Known as the Loadmobile Dump Truck, it has been designed for use inside the plant and can be found useful for the collection of broke or the collection of other waste materials for disposal, or for other possible use.

The picture above shows the truck's hydraulically-tilted position of 45°. This allows the refuse to slide out easily through the end gate.

The approximate capacity of the truck is 2 1/2 cubic yards, has maximum speed of 4 mph, is powered by a 383/405 amp. storage battery and is 9 ft., 8 in. in length. *Market Forge Co.*



32/ Use readers' service card.

Slitter-rewinders

Two new models of slitter-rewinders are being built by Black-Clawson Co.

Approved principles of slitting and rewinding have been built into these machines, which are of the two drum with riding roll design. The machines are suitable for 42 in. and 60 in. rewind capacity. Both machines are designed to operate at speeds up to 2500 fpm for score or shear cut slitting. *Black-Clawson Co.*

33/ Use readers' service card.

Acid handling equipment

The use of the new acid handling equipment, known as the Graver vacuum acid handling system, will increase safety in your mill.

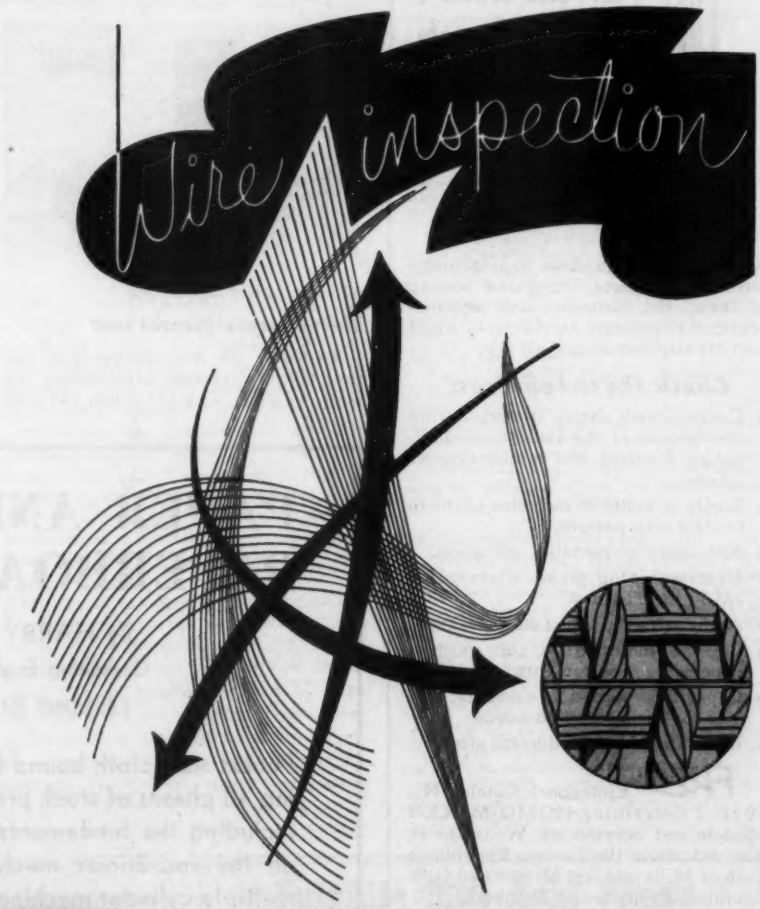
It enables the transfer, measurement and dilution of acid to be accomplished without the necessity of lifting carboys or drums and without subjecting any vessels to positive pressures.

The acid is drawn from the drum or carboy to the measuring tank by the vacuum created by the water-operated ejector. When the proper amount of acid is in the tank, the flow is stopped by merely opening a vacuum breaker. *Graver Water Conditioning Co.*

34/ Use readers' service card.

Water-base antifoam

A new antifoam, Nalco 71-K, is believed to be the first water-base liquid anti-



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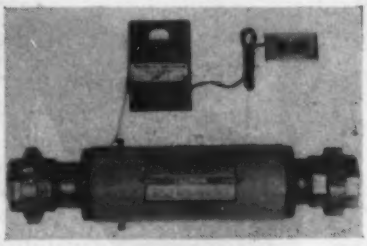
Samples for laboratory testing along with technical data are made available by the company. *National Aluminate Corp.*



35/ Use readers' service card.

Electric scale control unit

Known as the Aqua electric scale control, this unit prevents scale-forming elements in water, such as calcium and magnesium carbonates and sulfates from building up on the walls and tubes of equipment. It allows them to be precipitated in a soft condition.

These units can be obtained in five sizes. The pipe sizes range from ¾ in. to 4 in. and can treat from 18 to 450 GPM — depending upon the size. *Electric Scale Control Inc.*

36/ Use readers' service card.

New-type dolly for moving heavy equipment

This unit, called the "Express Roller", has been built for heavy-duty operations.

It is comprised of two main components: a series of moving rollers locked in an endless track and extending above and below a heavy steel frame.

The unit is manufactured in five sizes, having capacities from 2 to 150 tons—depending upon the size.

Complete data is available including specifications and recommended loads for each size roller. *Industrial East Co.*

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NEW LITERATURE

Books

THE CONDENSED CHEMICAL DICTIONARY. New 5th edition. Revised by Arthur and Elizabeth Rose. Published by Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y. Price: $12.00.

This new fifth edition is considered to be the largest and most complete chemical dictionary in both number and kind of entries.

The book includes data on the chemical and physical properties of chemicals and raw materials; newest information on containers shipping and safety instructions; and uses of chemicals in nuclear energy, chemotherapy along with other fields of current interest.

This is a practical book for the chemists, engineers, consultants, purchasing agents, or for anyone who is in need of chemical information.

TECHNICAL DICTIONARY PULP AND PAPER. Vol. 1: English-German, 223 pages; Vol. II: German-English, 226 pages. Published by Edward Roether, Verlay, Darmstadt, Germany. Price 25 DM (approximately $6.00 in American exchange). Also available from Stechert-Hafner Inc., 31 East 10th Street, New York.

An English-German and German-English dictionary is now available which is specially adapted to the technical terminology of pulp and paper making. In addition, it intends to relate fields such as cellulose chemistry, paper converting, and equipment manufacture.

The two volumes are prepared with characteristic thoroughness and should be of great value not only to the technical man, who has occasion to refer to articles published in German, but also to the salesmen and market research man interested in German production and the German market.

HANDBOOK OF CHEMISTRY. By Norbert Adolph Lange, Ph.D. Handbook Publishers Inc., Sandusky, Ohio. 5⅜ x 7¾. 1985 pages. Ninth edition. $8.50.

This handbook is the result of a number of years' experience in the compiling and editing of data useful to chemists and to those associated in the chemistry field. Every effort has been made to meet the needs of the chemist who is unable to facilitate a large technical library.

The contents include data on: elements, inorganic compounds, organic compounds, analytical chemistry, physical chemistry, industrial chemistry and also include tables.

FOREST AND RANGE POLICY. By Samuel Trask Dana. McGraw-Hill Book Co. 6½ x 9½. 455 pages. $6.50.

This book describes the development of forest and range policy in the United States from earliest colonial times to the present.

Although the treatment is primarily chronological, the developments relating to a particular subject are discussed together within the different periods. Special attention is paid to the forces that have been instrumental in controlling the evolution of policy and to the legislation which has been the means of expressing policy. A good deal of emphasis is placed on federal policies, partly because major developments in policy have usually centered around federal activities and partly because limited space does not permit discussion of developments at a state or private owner level.

The book is intended primarily for use as a text and for reference purpose for students of forestry, range management, and other fields of natural-resource management. It will also prove useful to professional men and executives in business and government; to biological and social science fields, and to the general reader.

Manufacturers' Publications

These items are numbered for your convenience. Copies of the publications may be requested at no obligation through our Readers' Service Dept. Use the handy business reply card which accompanies this issue.

37/ Use readers' service card.

Vertical Oil-lubricated Turbine Pumps. Layne & Bowler Inc. A bulletin describing the company's automatic lubricating turbine pump. Cut-away views of the pump's drive head are shown to give complete description of its many features.

38/ Use readers' service card.

Totally-enclosed Fan-cooled Motors. Allis-Chalmers Mfg. Co. This bulletin describes the latest design features of the totally-enclosed, fan-cooled motors in NEMA rerated ratings of ½ to 30 hp (Type GZ) and in non-rerated ratings of ½ to 100 hp (Type APZ). In addition to cutaway views of the motor, the bulletin includes tables of ratings and dimensions as well as a horse-power frame chart.

39/ Use readers' service card.

Seamless Welding Fittings and Flanges. Babcock & Wilcox Co. This folder describes briefly, but completely, the full line of carbon, alloy and stainless steel seamless welding fittings and forged steel flanges handled by the company. The different types of each are also illustrated.

40/ Use readers' service card.

The Standardaire Blower. Read Standard Corp. A 4-page bulletin containing selection charts and other useful information pertaining to the "Standardaire" blower, a modern compressor adaptable to either pressure or vacuum

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service. Charts give the blower model, brake hp and rpm needed to provide specified air-moving capacities in cfm at required pressures in psig or vacuums in inches of mercury.

41/ Use readers' service card.

Bailey Meters and Controls. Bailey Meter Co. Over 100 measuring, transmitting, receiving, recording, and indicating instruments and control components for power and process applications are described in a new 8-page bulletin. It also includes detailed literature reference for each product as well as 24 instrument and control applications.

42/ Use readers' service card.

Electric Log Stacker. R. G. LeTourneau Inc. An informative 6-page folder, containing charts and illustrations of the new, electric log stacker in operation, has been made available. The illustrations are on-the-job photos which depict actual performance of the machine. Also included, are general specifications pertaining to ow all size, fork length, turning radius and other facts.

43/ Use readers' service card.

Worthington Motor Drives. Worthington Corp. Motor drives with positive pulley adjustment, ranging from ½ to 25 hp, is described in an 8-page bulletin. It also contains complete information on how to select variable speed drives to meet any specialized requirement.

44/ Use readers' service card.

Packaging and Carloading Guide. Signode Steel Strapping Co. The 17th edition of packaging and carloading guide has just been published. This handy, 48-page booklet tells how to package and carload for maximum product protection at minimum cost.

45/ Use readers' service card.

Clarklift Features. Clark Equipment Co. Construction details, operating characteristics and maintenance features of the new Clarklift line of fork trucks are described in this 16-page brochure. Photos and drawings help explain many of the engineering features.

46/ Use readers' service card.

Effect of Diameter on Rubber Covered Squeeze Rolls. Rodney Hunt Machine Co. A report discussing and illustrating with graphs: deflection of typical rubber rolls under various loads; how roll deflection affects performance across the full width of the roll; and how roll diameter influences nip width. Other operational subjects are also discussed.

47/ Use readers' service card.

Spray Lubrication Systems. The Farval Corp. An 8-page brochure provides complete information on Farval spray lubrication systems for open gearing and slide surfaces. It gives descriptions of manual and automatic systems and component equipment along with actual application views.

48/ Use readers' service card.

Smoke and Combustion Controller. Minneapolis-Honeywell Regulator Co. A data sheet describing the operation and features of the Brown Electronik recorders. The data sheet also describes the revised Brooke smoke density system.

49/ Use readers' service card.

Link-Belt Company. Link-Belt Co. A 42-page brochure which presents a comprehensive idea

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on the company's scope, their products and the industries they serve. The booklet gives technical literature about their complete line of products.

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Hyster Lift Trucks. Hyster Co. Latest trends in lift truck design are shown in a new 12-page booklet. It gives reference and photos of 25 different industrial truck models ranging in capacity for 1000 to 30,000 lbs. It also illustrates several lift truck attachments.

51/ Use readers' service card.

Tygon Protective Coatings. U. S. Stoneware Co. This new manual is designed for use as a practical work book, presenting useful painting data in the form of charts, tables, diagrams and illustrations. All factors relating to the use of Tygon Protective Coatings in mild to severe corrosive service are covered in detail.

52/ Use readers' service card.

Gross-Dilts Heat Transfer Insert. Black-Clawson Co. Inc. Available in a reprint of an article and also a bulletin, is information describing the modern concept of cooling roll design using the Gross-Dilts heat transfer insert. The bulletin gives photos and diagrams of the unit.

53/ Use readers' service card.

Graphite draw down tester. F. C. Huyck & Sons. In the volume two number ten issue of their Felt Bulletin, the company has explained the use of the new graphite draw down tester for measuring paper finishes. The bulletin is completely devoted to this tester, giving photos and complete description on its use, and its features.

54/ Use readers' service card.

The Oliver Horizontal Rotary Filter. Dorr-Oliver Inc. This four-page bulletin describes the outstanding features, design, operation, sizes and capacities of the company's continuous vacuum-type horizontal filter. The bulletin includes drawings and diagrams illustrating the filter and its component parts.

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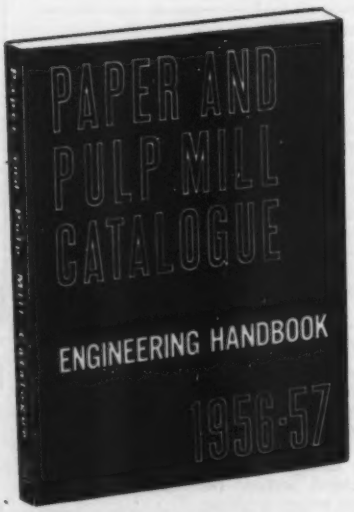

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	per cwt.	
No. 1 white shirt cuttings	13.50—	14.00
Soft unbleached muslins	15.50—	16.00
Fancy shirt cuttings	4.50—	5.00
No. 1 percales	5.50—	6.00
No. 1 washables	2.25—	2.50
No. 1 light silesias	6.50—	7.00
No. 1 light prints	4.75—	5.00
Light flannelettes	6.50—	7.00
Cottonades	2.75—	3.25
Blue overall cuttings	6.75—	7.25
Blue cheviots	6.75—	7.25
Canton flannels, bleached	10.50—	11.00
Canton flannels, unbleached	10.50—	11.00
Osnaburg cuttings	9.50—	10.50
Underwear cuts, bleached	14.50—	15.00
Underwear cuts, unbleached	14.50—	15.00
Sun tan khaki cuttings	5.00—	5.50
American linen cuttings	6.75—	7.25

Cotton Rags

The following are prices, cents per pound, paid by dealers and brokers f.o.b. New York:

	per cwt.	
No. 1 roofing (Chicago)	1.20—	1.25
No. 2 roofing (Chicago)	.80—	.85
Twos and blues, repacked	2.00—	2.25
Thirds and blues, repacked	—	
No. 1 whites, repacked	—	
No. 1 whites, miscellaneous	—	
No. 2 whites, repacked	—	
No. 2 whites, miscellaneous	—	

RAGS (Foreign)

(ex dock New York City)

New Rags

per cwt. — Nominal

- New dark cuttings
- New mixed cuttings
- New light silesias
- Light flannelettes
- Unbleached cuttings
- New white cuttings
- New light oxfords
- New light prints

Old Rags

per cwt. — Nominal

- No. 1 white linens
- No. 2 white linens
- No. 3 white linens
- No. 4 white linens
- No. 1 white cottons
- No. 2 white cottons
- No. 3 white cottons
- No. 4 white cottons
- Extra light prints
- Ordinary light prints
- Medium light prints
- Dutch blue cottons
- French blue cottons
- French blue linens
- Checks and blues
- Linsey garments
- Dark cottons
- Old shopperies

ROPE and BAGGING

F.o.b. and ex dock New York City

Gunny No. 1, domestic	6.25—	6.75
Gunny No. 1, foreign	6.25—	6.75
No. 1 manila rope, domestic	7.75—	8.25
No. 1 manila rope, foreign	6.25—	6.50
New burlap cuts (soft)	5.50—	6.00
Sisal strings	4.25—	4.50
Mixed strings	1.50—	1.75

WASTE PAPER

The following are prices, dollars per net ton, paid by brokers and large dealers for carload quantities of baled stock, f.o.b. cars New York:

No. 1 hard white envelope cuttings	105.00—	115.00
No. 1 hard white shavings	85.00—	90.00
No. 1 soft white shavings	55.00—	60.00
Soft white shavings, uncoated	60.00—	70.00
Fly leaf shavings No. 1	28.00—	33.00
Fly leaf, woody, No. 1	35.00—	40.00
Mixed colored shavings	18.00—	23.00
No. 1 books and magazines	17.00—	18.00
Ledger stock, white, No. 1	50.00—	55.00
Ledger stock, colored, No. 1 (Midwest ship)	35.00—	40.00
New manila envelope cuttings (free of groundwood)	75.00—	80.00
New manila envelope cuttings (containing groundwood)	55.00—	60.00
Manila tab cards	75.00—	80.00
Colored tab cards	50.00—	60.00
New all-kraft envelope cuttings	70.00—	75.00
Triple sorted kraft, 100%	35.00—	40.00
No. 1 old kraft	30.00—	
White news cuts, No. 1	72.50—	75.00
No. 1 overissue news	18.00—	19.00
Folded news, special	16.00—	17.00
Folded news, ordinary	13.00—	14.00
Old corrugated boxes	17.00—	18.00
New jute corrugated cuts	21.00—	22.00
Mill wrappers	18.00—	20.00
Boxboard cuttings	8.00—	
No. 1 mixed paper	10.00—	11.00

CHEMICALS

F.o.b. New York City

Alum, ammonium		
Granular, bags, works, cwt.	4.30—	
Lump, drums, works, cwt	5.05—	
Powdered, drums, works, cwt	5.20—	
1-Arginine, drums, kilo	74.80—	
Blanc Fixe		
Direct process, bags, c.l., works, ton	110.00—	
L. c. l., works, ton	120.00—	
Bleaching Powder, drums, cwt		
Casein, domestic acid precipitated		
Standard, bags, 10,000-lb. lots or more, shipping point, lb	.32—	Nom.
Premium, bags, 10,000-lb. lots or more, shipping point, lb.	.38—	Nom.
China Clay, domestic dry-ground, airfloat, 99%		
325-mesh, bags, c. l., Georgia works, ton	10.00—	
300-mesh, bags, c. l., Georgia works, ton	13.50—	14.50
Imported, white, lump, bulk, c. l., ex dock Phila, Portland, Me., gross ton	20.00—	35.00
Chlorine, liquid		
Tanks, single units, works, freight equaled, cwt	3.15—	
Glycerine, refined (CP, USP) 99%, drums, c. l., delivered, lb	.29½—	
Litharge, commercial powdered		
Barrels, c. l., works, freight equaled, lb.	.18	—
Rosin, gum, c. l., f.o.b. New York, cwt		
E	9.30—	
F	9.30—	
G	9.30—	
WW	9.90—	
Rosin, wood, c. l., f.o.b., shipping point, cwt.		
K, M	8.25—	
N	8.30—	
WG	8.50—	
WW	8.65—	
Saltcake, domestic, bulk Works, 100% Na_2SO_4 basis ton	28.00—	
Soda Ash		
Dense, 58%, paper bags, c.l. works, cwt	1.90—	
Light, 58%, paper bags, c. l. works, cwt	1.85—	
Soda, caustic		
Flake, 76%, drums, c. l. works, freight equalled, cwt.	4.70—	
Solid, 76%, drums, c. l. works, cwt.	4.30—	
Sodium Silicate		
40°Be, 1:3, 2, turbid, drums, c. l., works, cwt.	1.45—	
52°Be, turbid, 1:2, 4, drums, c. l., works, cwt.	2.45—	
Starch		
Pearl, 140-lb. bags, cwt.	7.42—	
Paper (Sq.), bags, cwt.	7.27—	
Powdered, 140-lb. paper bags, cwt.	7.39—	
Sulfur, crude		
Bulk, c. l. mine, contract, long ton	26.50—	
Talc		
Domestic, bags, c. l. works, ton	33.00—	39.50
Canadian, ground, bags, c. l. works, ton	20.00—	35.00
Titanium Dioxide		
Pigment, calcium-rutile base, regular, bags, c. l., lb.	.09¼—	
High-tinting, drums, c. l., lb.	.09	—
Zinc Oxide Pigment, American process		
Lead-free, bags, c. l., freight allowed, lb.	.14½—	
Leaded, 35%, bags, c. l., freight allowed, lb.	.15½—	

WOOD PULP

Quotations on domestic and Canadian pulp, dollars per short air-dry ton delivered consuming mills including basic allowances, follow:

Bleached sulfite, No. 1	.150.00—
Bleached sulfite, Canadian	150.00—
Unbleached sulfite	....130.00—
Unbleached sulfite, Canadian	.....130.00—
Bleached soda	.....145.00—
Bleached soda, Canadian	.145.00—
Kraft, bleached hardwood	150.00—
Kraft, bleached	.....152.00—155.00
Kraft, bleached southern	155.00—
Kraft, bleached Canadian	155.00—
Kraft, unbleached southern	.....117.50—122.50
Kraft, unbleached, Far West	.....125.00—
Kraft, unbleached Canadian eastern	.....130.00—
Kraft, unbleached Canadian western	.....120.00—125.00
Kraft, semi-bleached southern	.....140.00—
Sulfite screenings	..... 72.50—
Sulfate screenings	..... 67.50—
Groundwood, domestic	.. 82.50— 90.00

Quotations on imported wood pulp, dollars per short air-dry ton on dock American Atlantic ports, follow:

Bleached sulfite, Swedish, freight allowed	....150.00—
Bleached sulfite, Norwegian	—
Bleached sulfite, Norwegian, del'd with limited freight allowance	.....150.00—
Bleached sulfite, Finish, freight allowed	.....150.00—
Unbleached sulfite, Swedish, freight allowed	..130.00—
Unbleached sulfite, Finnish, freight allowed	..130.00—
Kraft, unbleached, Swedish, freight allowed	..125.00—
Kraft, unbleached, Finnish, freight allowed	..125.00—
Kraft, bleached, Swedish, on dock	.....155.00—
Kraft, bleached, Norwegian	.....155.00—

PAPER

Quotations are mill quotations Chicago

Boards (prices per ton, delivered in Chicago, 10 tons or more):	
Plain chip	.....107.50
News vat lined chip	.....110.00
.009 chip, rolls	.....100.00
Filled news	.....111.50
Solid news	.....114.50
White vat lined chip	.....144.50
Chip tube and can stock	.....112.50
Single manila lined chip	.....162.50
Single jute lined chip	.....147.50
Container, 42-lb.	
Kraft liner (per 1000 sq. ft.)	.. 2.68
White patent coated	
.020	.....175.00
.018	.....177.50
.016	.....182.50
Book Paper (f.o.b. Chicago, c.l. cases per cwt):	
No. 1 enamels	..... 19.80
No. 2 enamels	..... 18.80
Machine-coated, 45- to 100-lb.	..... 14.75— 18.40
60-lb. + uncoated offset, 25 × 38 (2000 lb.)	..... 16.55
"A" grade English finish untrimmed, 25 × 38 (2000 lb.)	.... 15.65
Rag Content Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):	per cwt
100% rag	..... 63.20
75% "	..... 48.45
50% "	..... 36.95
25% "	..... 31.00
Rag Content Ledger (white, 5000 to 100,000-lb., ream sealed cartons):	
100% rag	..... 64.40
75% "	..... 49.60
50% "	..... 38.10
25% "	..... 32.20
Sulfite Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):	
No. 1	..... 21.85
No. 2	..... 21.15
No. 4	..... 19.75
Sulfite Ledger (white, 5000 to 10,000-lb., ream sealed cartons):	
No. 1	..... 23.10
No. 2	..... 22.35
No. 4	..... 20.95
Newsprint (contract base price)	per ton
Rolls, standard	.....131.00
Rolls, spot	.....185.00—220.00
Sheets	.....Standard differentials
Tissues (carlots)	per ream
White No. 1	
White No. 2	
Bleached anti-tarnish	
Colored	
Anti-tarnish kraft	
Manila	
Napkins, semi-crepe (12½ lb. to M shts) per case	
Napkins, full crepe and embossed (12½ lb. to M shts) per case	
Toilet, bleached (M shts) per case	
Toilet, unbleached (M shts) per case	
Wrappings (kraft, basis 50 lb. and heavier)	per cwt
Standard wrapping	..... 9.25
Butchers, counter rolls	..... 10.25
Standard bagging, mill rolls	
Shipping sack, mill rolls	
Gumming, mill rolls	
Asphalting, mill rolls	
Envelope, mill rolls	

SMIDTH

Rotary Kilns

For Reburning Lime Sludge

We are specialists in the design and manufacture of rotary kilns, coolers and auxiliary equipment for burning lime, lime sludge and for many other purposes. Over 1,000 Smidth rotary kilns have been furnished all over the world.

Shown below is the second Smidth Rotary Kiln for reburning lime sludge at the Canton, North Carolina, plant of the Champion Paper & Fiber Co.

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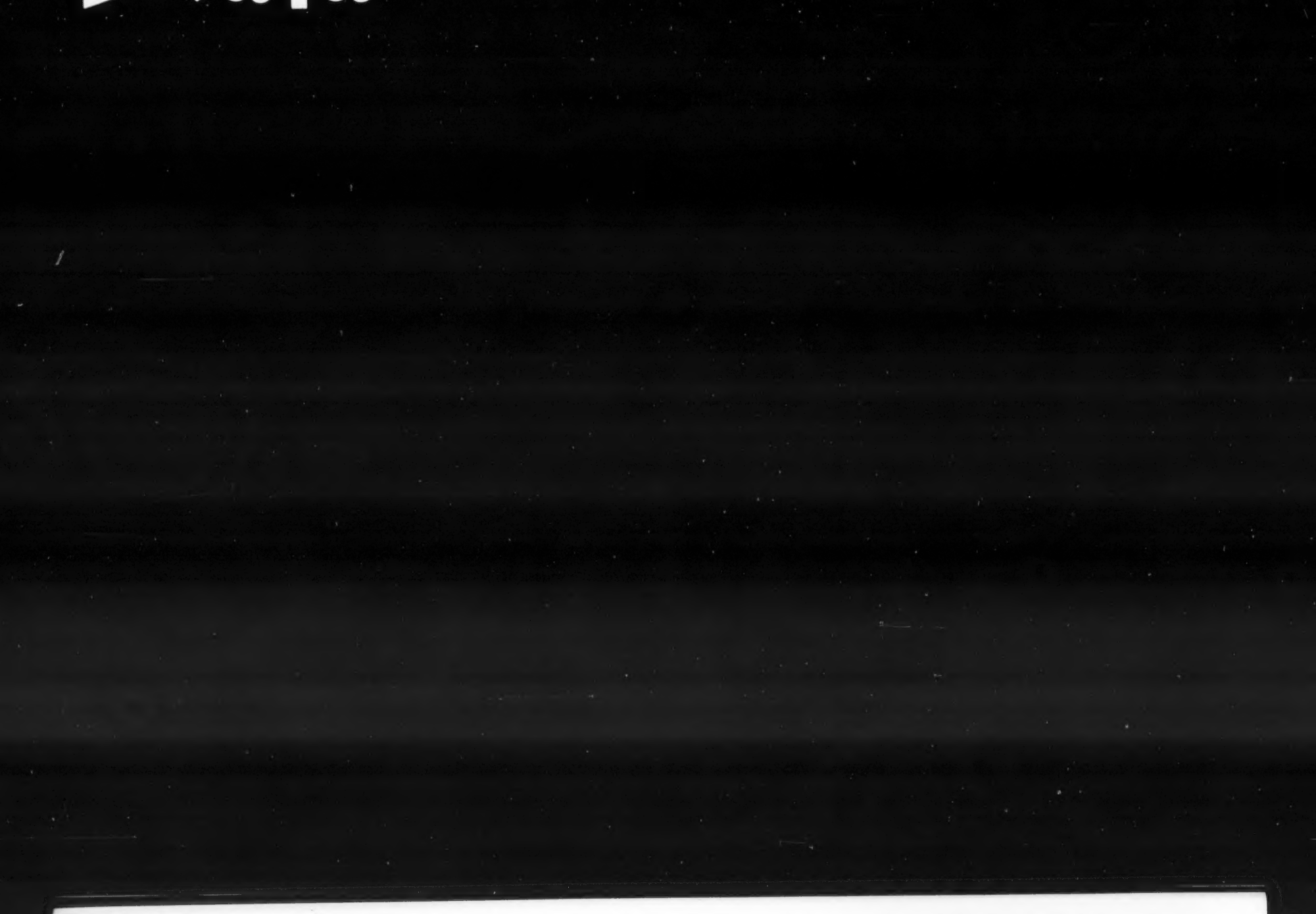

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— A POTENT SAFETY TOOL

Posters should be one of the top aids in your safety program. No other safety medium can reach your entire audience—not once, but many times each day—with such low-cost safety messages. They are directed at the worker acts and worker attitudes that lead to accidents. Posters lend *timeliness, repetition and continuity* to your safety program . . . the three fundamental principles of direct selling.

The National Safety Council maintains a stock of posters that covers all industries, operations and phases of safety and health. These posters are produced in three sizes: "A" size, 8½" x 11½"; "B" size, 17x23"; and "C" size, 25x38". Their colorful illustrations and eye-catching captions make them ideal for the mass selling of safety.

Write for a free copy of the Directory of Occupational Safety Posters. This 72 page catalog illustrates 744 posters, indexed and classified for specific operations.

NATIONAL SAFETY COUNCIL

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PAPER INDUSTRY

Whither?

. . . in production, processes, new products, markets

Acceleration of plant growth

Gibberellic acid, applied in concentrations as low as 1 part per million in the form of a foliar spray, can double or even triple the growth rate (as determined from height measurements) of many plants.

USDA scientists at the Agricultural Research Center, Beltsville, Md., are planning to expand their research with gibberellic acid to include, among others, the effect of this growth accelerator on the rate of pulpwood growth. Preliminary experiments have already shown that the growth rate was markedly increased in such forest trees as willow oak, tulip poplar and maple, while the response of two species of pine and white spruce was only slight.

Gibberellic acid is produced by the fungus Gibberella and is obtained by methods similar to those used in producing antibiotics.

Supply of bagasse is immense

Worldwide, there is an annual supply of more than 25,000,000 tons of bagasse. In Louisiana and Florida, 900,000 tons of bagasse are produced annually.

With the development of practical methods of removing pith from fiber and the use of the mechanochemical process of pulping, unbleached and bleached pulps can now be made economically and competitively from de-pithed bagasse for the manufacture of corrugated boxboard, newsprint and fine papers.

The pith itself can be used as a dry form molasses carrier. With its high absorption value for blackstrap molasses, the pith can be mixed with molasses to produce a high-energy ingredient for livestock feed.

Continuous pulping at atmospheric pressure

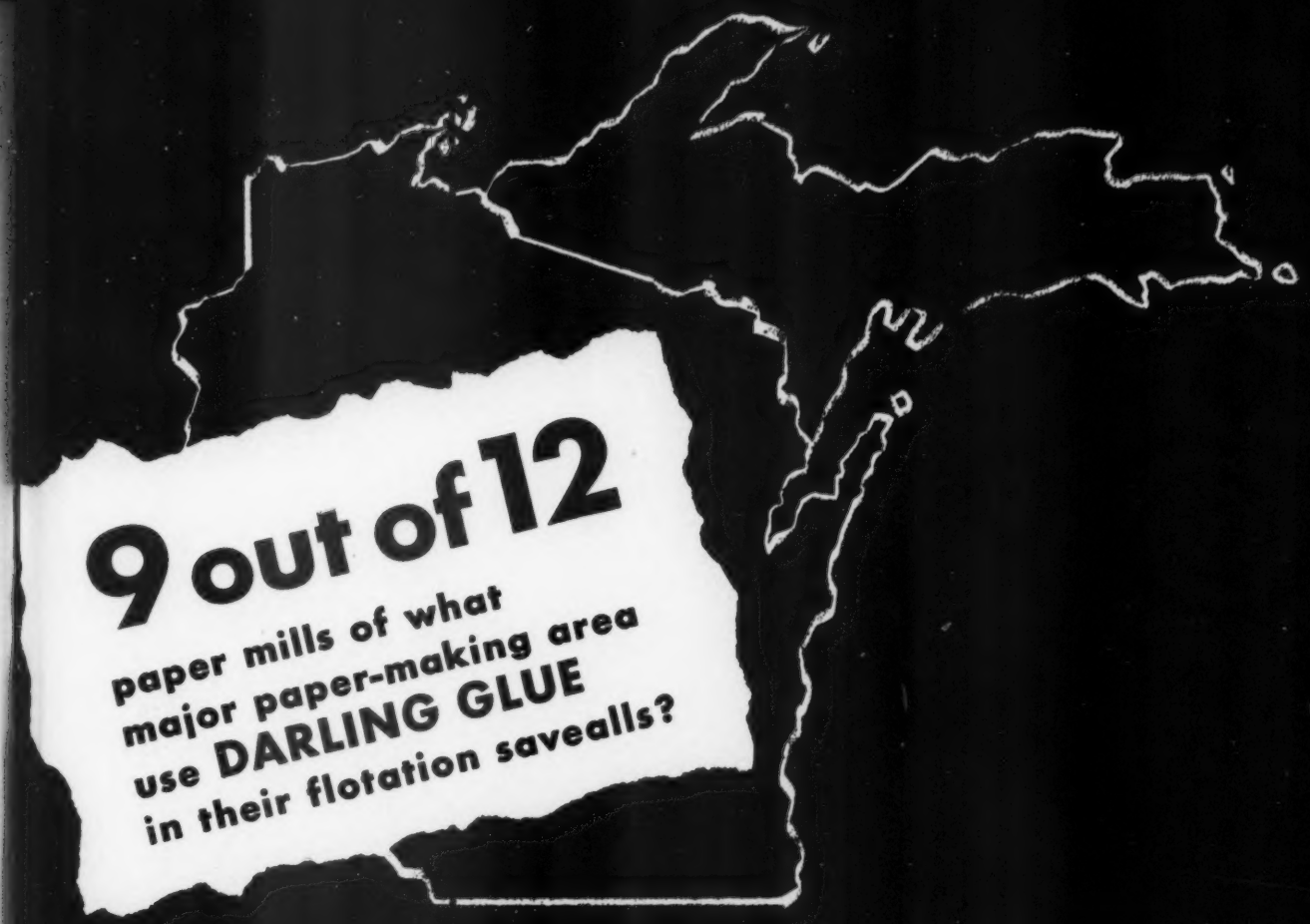
The development in the near future of high-speed continuous chemical pulping at atmospheric pressure is envisaged by the Canadian Pulp & Paper Association in its report to the Royal Commission on Canada's Economic Prospects. Wood, in the form of thin wafers, would enter a pipe continuously at one end and come out as finished pulp at the other in a matter of five minutes or less. The entire operation, including bleaching, would be carried out under exact and complete controls.

The pulp so produced might have new and improved properties, due to a shortened exposure of the cellulose to the action of chemicals and the harmful effect caused by chipping.

The first titanium-lined chlorine dioxide mixer

The first titanium-lined chlorine dioxide mixer has been in operation at the Riegel Paper Co. mill, Acme, N. C., since December, 1955. At its scheduled shutdown on May 30, 1956, the mixer showed no measurable signs of corrosion of the titanium lining, while the usual visible corrosion at the ends of the mixer made of a high chrome-nickel-molybdenum alloy was noticeable.

The life expectancy of a chlorine dioxide mixer made of conventional corrosion-resistant alloys is normally rated at one year. A measure of titanium's corrosion resistance, as shown by experimental exposure tests in liquors containing 4-7 gr. per liter of chlorine dioxide, is indicated by a corrosion rate of less than 0.00002 inches per year.



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QUESTION • **WHY?**

ANSWER • **Because, in FLOTATION TYPE SAVEALLS— comparative, competitive tests in paper mills throughout the country have established this significant fact—**

In the great majority of cases, one of DARLING'S specifically-formulated GLUES will reduce costs, while maintaining or improving flocculating efficiency.

We'd like to work with you in making just such a test in your mill. The entire cost is on us. You've nothing to lose . . . plenty to gain. You can make arrangements through your Darling sales representative. Or write or call us collect.

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improved BONE
GLUE

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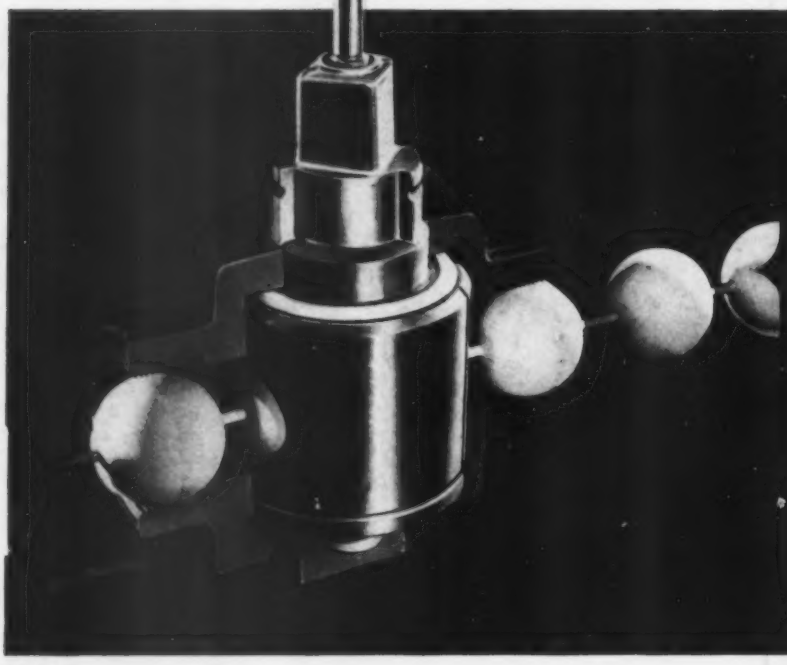
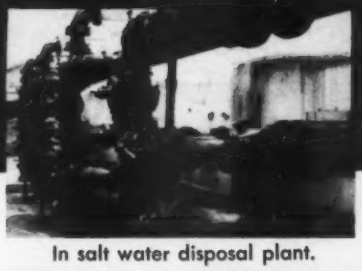


ROUND PORT MEANS FREE FLOW ALL THE WAY



In salt water disposal plant.

You get full volume, unrestricted flow throughout the entire piping system when you use acf Round Port Valves.

The pipe-matching port openings cause no loss in head pressure—offer no more resistance to flow than the pipe itself. There are no obstructions—no turbulence and no harmful abrasive effects from solids in suspension. Even the most heavy viscous ladings flow freely through acf Round Port Valves.

Split-second quarter-turn shutoff, non-wedging cylindrical plug, Teflon* head gasket, are additional advantages that add to perfect performance of acf Round Port Valves—that mean extra long trouble-free service—lower maintenance costs and fewer work stoppages.

Act now to step up valve performance—to keep maintenance costs down. Representatives in 50 principal cities.

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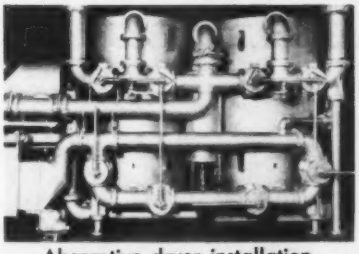

Absorptive dryer installation.

In natural gasoline plant.

In oilfield service

W-K-M

DIVISION OF acf INDUSTRIES INCORPORATED

PLANT: MISSOURI CITY, TEXAS
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